Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Sound Waves, Telephone Magazine and The Telephone

Vol. XVIII **CHICAGO, SATURDAY, JULY 17, 1909** **No. 3**

PUBLISHED EVERY SATURDAY BY THE

Telephony Publishing Company

Monadnock Block, Chicago

Telephone Harrison 2951

H. B. McMeal, President — F. S. Kenfield, 1st Vice-President
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The present publication comprises

Vol. 57	The Telephone	No. 3
Vol. 34	Telephone Magazine	No. 3
Vol. 20	American Telephone Journal	No. 3
Vol. 18	Sound Waves	No. 3
Vol. 18	Telephony	No. 3

TERMS OF SUBSCRIPTION:

United States, Cuba and Mexico.....per year, $3.00
Canada 4.00
Other Foreign Countries within the Postal Union..... 5.00

NOTICE TO ADVERTISERS

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements accepted up to noon of Monday for the paper dated Saturday of the same week.

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Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1879.

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CONTENTS.

Editorial 47-48
The Telephone Engineer in His Relation to the Telephone Business. By Roy Owens..... 49
H. T. Cedergren—An Appreciation..... 53
Independent Toll Lines in Indiana..... 56
Telephone Reminiscences. By C. E. McCluer..... 58
Telephone in the Courts. By A. H. McMillan..... 61
Letters on Practical Subjects..... 62
A Washington River Crossing. By H. E. Constantine..... 62
Practical Questions and Answers..... 64
Telephone News..... 65
New Equipment and Sales..... 66
A Pioneer, Still Working at the Job..... 68
Condensed News Reports..... 69-70

Bell Promoters and Public Morals.

Two officers of the Citizens Telephone Company, of Racine, Wis., were offered a "fee" of $20,000 to turn over a controlling interest to the Wisconsin (Bell) Telephone Company. This statement was made at a public meeting by Charles R. Carpenter, the treasurer of the Citizens company, and cashier of the Commercial and Savings Bank of Racine, and was reported in the Racine *News* under date of June 16, 1909.

Mr. Carpenter made this announcement when stockholders first began to suspect that they had been deceived by statements about the value of their holdings, with the purpose of creating a panic, and causing them to sell in haste. Some one precipitated the disclosure by a hot-headed remark to the effect that "there was a nigger in the wood-pile, and some one was to receive a rake-off."

Carpenter declared that although two officials had been approached with offers of a fee, they had declined to act as individuals, and had endeavored to arrange terms of sale under which all stockholders would share equally, according to their holdings, in the entire price paid by the Bell company for the privilege of inflicting a telephone monopoly on the people of Racine.

It is a credit to these officers that they stood by their associates, working for the company, and not greedily to fill their pockets; it is fortunate for Racine that the merger was not effected, to be the forerunner of monopoly service, at monopoly rates. But these are not the main points.

The big question is—Was the method adopted to procure this desired monopoly honest? Arguments may be advanced by some to whose interest it is to have the public believe it honest. But we challenge President Alonzo Burt of the Wisconsin Telephone Company to produce an argument which will convince the public that this is an upright way to gain control of a competitor. It looks too much like a bribe to the men who are in a position to know the value of the property.

The case of Winterbotham, secretary of the Railroad Commission, is fresh in the public mind. He created for himself a dual personality to explain his acceptance of a fee for promoting a combination of competitors at Madison. Mr. Winterbotham, citizen, wanting money, which he could get from the telephone people, had one conscience and an individual code of ethics. Secretary Win-

terbotham, who minutely examines the operation of the Independent companies and "uncontrolled" sub-licensees of Wisconsin, and keeps their records—may have another kind.

The public and the minority stockholder represent the true, underlying strength of the telephone industry. Their support is the support which is sought, and which must be had if a company is to grow and prosper. How do they look upon a merger promoted in the dark, with secret fees to persons in a position to bring to bear local influences, acting with hidden motives?

In Wisconsin the fact of the offer of a secret commission has been made public fortuitously in two notable instances. In each case the fee was offered; in each case it was a big one, big enough, as the phrase goes, to be a "temptation"; and in each case the offer was secret. How about mergers in other places? What do the minority stockholders think? What does the man who is paying higher rates, and getting a poorer service think? Some time these people will **know.**

Trade Indications

Mid-summer is usually considered a comparatively poor time to talk about ordering manufacturing and delivering in the telephone business. But this season finds that even the "growler" has at least an ear to the ground listening for a louder hum as the wheels of the car of progress pick up speed in preparation for a good run in the autumn.

We feel that approach-of-prosperity kind of breeze blowing across the country now because, taking thing as a whole, crops are turning out well and this year's harvests are going to average large, perhaps extraordinarily so, for most products. Big business is loosening up and spending money. Buildings are going up oftener all over the country. Railroads are buying cars and engines, and putting men to work. Repair shops are working at full time taking care of all that deferred maintenance, and producting factories are beginning to take care of that deferred demand, which, as soon as things really begin moving, are such helps in bringing the mechanism of commerce up to speed.

In any industry the big interests are conservative. In the Independent telephone field, operators of large systems for many months "said nothing but saw wood." It is true we saw gross receipts increase, but we also saw expenses cut very closely, and we did not see new equipment going in. But now we find that extensions have been financed and, what is more, ordered for definite delivery. St. Joseph, Mo., will use a lot of equipment. The St. Paul, Minn., system will be enlarged. Cleveland is putting in new branch exchanges, and so are Columbus and Lincoln. The Montana Independent is making remarkable progress. The Federal company, of western New York, is doing its share. In fact, all along the line we note that money is enough easier so that the big companies are swinging into line to take care of the demand for service. The managers of some of the biggest projects are still sawing wood, but when the sticks do drop they will make quite a thump. Small companies are sending in their orders more freely, and we hear rumors of many getting ready for rebuilding. New companies, particularly those in rural districts, are being incorporated in as great numbers as at any time in the past three years. It is to be anticipated that a considerable portion of these will have made a start on their systems at least by early fall.

Taking it all in all, things do look pretty good in the Independent telephone industry.

Departmental Relations.

The successful running of a small telephone company is essentially a one-man affair. The competent manager is able to oversee and direct most, if not all, of the work, and hence can be assured of the complete carrying out of his plans. But in larger systems this cannot be done. Trusted employes must be put in charge of certain portions of the work, for which they are held responsible. This soon leads to the development of separate departments, each with definite duties. Under the head of the company are several departments, each with its head, who reports in turn to the head of the company. Again, each department is divided into sub-departments, and so on until an elaborate system is built up.

The proper organization of such a system is one of the fundamentals of success. Yet its very size and the division into departments may become a fruitful source of real loss. These departments may soon come to have little or no interest in each other. Each may perform its allotted tasks as if the others were hardly in existence. Each may be chiefly concerned in building up a reputation for itself, if need be at the expense of other departments.

Since all are dealing with the same physical plant, they overlap in the work. The construction department puts up a piece of work, based on the specifications of the engineering department, and the maintenance people must take care of it. Lack of foresight, discrepancies, and errors on the part of one are quickly discovered by another. Each is in a position to render valuable aid to the others in detecting leaks and saving trouble for the company.

But unfortunately, too often each department bitterly resents any suggestions from the others. There is a tendency to get angry, and then to try to "get something on" the other fellow. Cases have been known in which the maintenance department sent out a special inspector for the sole purpose of finding some deviation from the specifications on the part of the construction men.

Now, meddlesome interference is bad, but lack of proper co-operation is every bit as bad. All personal feelings must be put aside for the common good. Let the right attitude start at the top of the organization and work downward. See to it that efficient men of broad caliber are advanced. Those of he wrong type can be gradually dropped.

This spirit of departmental touchiness ought not to exist. The manager and stockholders do not want it. The public, who pay the bills, do not want it. Each department is part of one system, and all the men on the staff ought to work harmoniously to build up the service of the public and the dividends of the stockholders.

The Telephone Engineer in His Relation to the Telephone Business*

By Roy Owens

The three divisions of telephone engineering are, planning, constructing, and maintaining. It is not uncommon to hear engineers say that they wish to devote themselves to construction and not to maintenance. Some of these are apparently indifferent to the planning. In these respects they are not giving themselves credit for being complete engineers. Sometimes, but not always, it is fair to say that they wish to reap the reputation of fair-appearing construction work without suffering criticism that time and the repair processs may bring upon their work.

The planning is the really vital part of a telephone engineer's duty. One reason why more plants have not shown the result of poor design is that the demand for telephone service in years past has tended to outrun the capacity of the plants, so that even a poorly laid out cable system has found practically all of its cable pairs called for. As time goes by, however, and subscribers are more difficult to procure, the need of more care in the laying out of the plant will become manifest.

The treatment of this subject was suggested to me by references of one with railroad experience to a work on the subject of "The Economic Theory of Railway Location," by Mr. A. M. Wellington. This work was first published more than twenty years ago, and was so well conceived and so well written, it is said, that it has not been improved upon in the expression and application of underlying principles. From its introduction I will present some abstracts.

Those who will listen to the reading cannot perceive all the quotation marks. For those who will read I cannot by marks indicate all my use of others' ideas.

"It would be well if engineering were less generally thought of, and even defined, as the art of constructing. In a certain important sense it is rather the art of not constructing; or, to define it rudely but not inaptly, it is the art of doing that well with one dollar, which any bungler can do with two after a fashion.

"There are, indeed, certain great triumphs of engineering genius—the locomotive, the truss bridge, the steel rail—which so rude a definition does not cover, for the bungler cannot attempt them at all; but such are rather invention than engineering proper. There is also in some branches of engineering, as in bridge-building, a certain other side to it, not covered by such a definition, which consists in doing that safely, at some cost or other, which the bungler is likely to try to do and fail. He, therefore, in such branches, who is simply able to design a structure which will not fall down, may doubtless in some measure be called an engineer, although certainly not one of a very high type.

"But to such engineering as is needed for laying out railways, at least, the definition given is literally applicable, for the economic problem is all there is to it. The ill-designed bridge breaks down; the ill-designed dam gives way; the ill-designed boiler explodes; the badly built tunnel caves in, and the bungler's bungling is betrayed. But a little practice and a little study of field geometry will enable anyone of ordinary intelligence, without any engineering knowledge whatever in the larger sense, to lay out a railway from almost anywhere to anywhere, which will carry the locomotive with perfect safety, and perhaps show no obtrusive defects under what is too often the only test—inspection after construction from the rear end of a palace-car. Thus, for such work, the healthful checks which reveal the bungler's errors to the world and to himself do not exist. Nature, unhappily, has provided no way for the locomotive—like Mr. Jingle's intelligent pointer—to refuse to pass over an ill-designed railway as it refuses to pass over an ill-designed bridge.

"Therefore, since there is no natural line between safety and danger to mark even so rude a distinction as that between the utterly bad and the barely tolerable, in the kind of engineering work we are to study, one may fairly say that the locating engineer has but the one end before him to justify his existence as such—to get the most value for a dollar which nature permits; and but one failure to fear—that he will not do so. Except as his work necessarily involves the preliminary design of constructive details, he has no lives to save or imperil; and the young engineer cannot too early nor too forcibly have it impressed upon his mind that it takes no skill worth speaking of to do such work after a fashion, unless in the comparatively few localities (rare indeed in the United States) where to get a reasonable line of any kind is something of a feat. His true function and excuse for being an engineer, as distinguished from a skilled workman, begins and ends in comprehending and striking a just balance between topographical possibilities, first cost, and future revenue and operating expenses.

"Whereas the "operating expenses" of bad bridge engineering come in a series of startling catastrophes which shock the community and dismay the moneyed interests concerned, causing good work to be appreciated and insisted on, and scaring off the amateurs and 'prentice hands from "meddling and muddling," after the manner of their kind, the operating expenses from bad railway location come by a gentle but unceasing ooze from every pore, which attracts no attention, albeit resulting in a loss vastly larger than any possible loss from bad construction; for it requires some training and experience even to appreciate the loss as existing, and still more of both to appreciate it as remediable.

"The permanent difficulty lies in this: High efficiency in any art or calling in which many minds of no phenomenal gifts are engaged requires that every man's work should be readily comparable either with a certain uniform standard or with the work of his fellows. In constructive engineering this is possible. Broadly speaking, a hundred-foot bridge is a hundred-foot bridge, the world over. It has everywhere to fulfill but two primary conditions: It must carry a certain nearly uniform load per foot, and it must not fall down. The same is in substance true of every form of constructive engineering. Every man's practice herein, therefore, is comparable, and is compared, with the highest level of practice, the world over. Those most highly skilled are discovered and recognized. The moderately skilled perceive and correct their deficiencies. The hopelessly unskilled retire to other pursuits.

"In laying out railway lines, and less strikingly in some other analogous kinds of engineering work, this is forever impossible. We cannot reduce the laws of topography, nor

*A paper presented at the 1908 convention of the International Independent Telephone Association.

even of finance, to equations and formulas. Every line is a problem by itself, with its own peculiar physical and commercial conditions, so that the engineer is deprived of the aid to be had by comparing with, and copying the details of, the practice of others. Under these circumstances, the difference of conditions will be apt to be honestly accepted by the reader who may have sinned against good practice, and by all others concerned, as the reasons why another line, one hundred or one thousand miles off, should have cost so much less and yet be so much better worth owning than his own. He who has done well, therefore, is cut off from any absolute knowledge and general recognition of that fact, and the guilty reader, who has done ill, is cut off from the still greater gain which would come to him from a revelation of where and wherein he has done ill. In most such cases each will have in some detail shown better judgment than the other; but from the lack of unquestionable evidence of this, each is denied the instruction which he might otherwise receive from that fact, and so is in great danger of falling into the most natural and most human error, believing that all that he has done is good, which has not been proven to be bad, and so ceasing to make effort to improve upon what is good enough to pass, and merely multiplying errors with advancing experience, without really advancing in knowledge.

"Inasmuch as no one can even know for himself the absolute quality of his own skill in this particular branch of engineering, it is almost a natural corollary that corporations should very uniformly decline to take it for granted, by assuming that there are any measurable differences in qualifications for such work among those who have proved their competency in other branches of engineering. Hence it happens that railway location tends more and more to be entrusted to those to whom it is a mere temporary incident in their professional career, and who consider the work mainly from the constructive standpoint, without much attention to those larger economic questions which it is the purpose of this volume to discuss, and to which, in well-conducted work, the mere constructive details should be wholly subordinate. But as the inexperienced young man can only gauge the importance of various work by the attention which he sees paid to it by his superiors, he is, as it were, pushed by others into an error which it is difficult for him to avoid at best; for he will soon note that the assumption and practice of the world is, that whoever is fit to design the structures of a railway is thereby fitted, without further study or preparation, to design the railway as a whole. In fact, this vicious principle is in very many instances pushed to the absurd extreme of entrusting engineers of inferior capacity with the location of railways, and only seeking for a higher grade of skill when the design of the cheaper man is to be embodied in construction. The error in so doing is the same in kind and degree, etc. as if it were assumed that whoever was fitted to build a house was fitted to design one. The mental qualities and special training needed are much the same in each case, but the two kinds of work are distinct, and skill in one does not argue skill in the other."

This is not too long an extract from a dissertation which really ought to be quoted in its entirety. It contains the distinction which we ought to keep in mind between the engineer as a designer and the engineer as a skilled workman. For my immediate purposes I wish to speak of skilled workmanship only so far as it is applied in forms that reduce future maintenance expenses. I shall try to show that one of the forms of waste to be avoided is that of building too much and building too well. From the standpoint of the maintenance engineer alone there is seldom such a thing as building too well; but in the balance of costs between interest and repairs, which ought to be struck for the benefit of the owner, the constructing engineer should look ahead to see whether he is not laying up interest charges and assuming risks of loss greater than the repair and renewal charges on a less expensive form of construction would warrant.

As illustrating the importance of the work of the engineer on a telephone plant in planning, building, and maintaining, I may mention that one of the largest of the local Independent telephone companies shows that out of the total of its expenditures, exclusive of profits and additions, for a given period, 28 per cent went to maintenance and depreciation accounts, and 37 per cent interest and preferred stock dividends. The operating and general expenses together were about 26 per cent of the total expenditures. One of the important long distance companies shows 18 per cent of its total like expenditures going for maintenance and depreciation, and 47 per cent for interest and preferred stock dividends. Another important local company shows the interest and preferred stock dividends account to run about 35 per cent of the expenditures, and the maintenance and depreciation account about 40 per cent. These are roughly the proportions of the total outlay of these companies which have been more or less directly under the control of the engineer. Within these, of course, are some which the engineer could not oversee or control, but on the other hand his work does have some influence upon the cost of operation, upon the general expenses, and upon the taxes. These percentages go to show the need for the telephone engineer to be a good deal of a manager, and for the manager to be a good deal of an engineer.

The importance of the original planning may be illustrated by another quotation:

"The location of a railroad is giving it its constitution. It may be sick, almost unto death, with accidents of construction and management, but with a good constitution it will ultimately recover."

In beginning his work on any new plant the engineer may expect to have two primary limitations, the amount of money which he may be permitted to spend, and the revenue which that expenditure must yield. The question of revenue presents itself in two divisions, that which is assured, and that which is problematic. For the assured revenue the justifiable expenditure may be easily calculated; for the problematic revenue any construction investment is speculative. I wish to turn attention to some opportunities for speculation with small sums rather than large ones.

To show the loss by over-building, I include a table exhibiting the effect of compound interest investment at ten per cent for one dollar and for three fractions thereof up to twelve years. This period is sufficient to multiply the principal by three. Telephone companies cannot always invest their surplus at this rate, but under certain conditions of their plant, with rentals coming in quarterly in advance, they can do better.

To apply these figures to sundry examples:

Years	$1.00	.3333	.50	.75
1	1.10	.36	.55	.83
3	1.21	.40	.61	.91
3	1.33	.45	.67	1.00
4	1.46	.49	.74	1.10
5	1.61	.54	.81	1.21
6	1.77	.59	.89	1.33
7	1.95	.65	.98	1.46
8	2.14	.72	1.08	1.61
9	2.36	.79	1.19	1.77
10	2.59	.87	1.31	1.85
11	2.85	.96	1.44	2.04
12	3.14	1.06	1.58	2.24

Take the question between supplying 25-pair or 50-pair cable on 20 runs where the need for more than 25-pair is uncertain on any particular run, with the probability that 50 pairs will be needed at some time on some of them. To give the example simplicity: The 25-pair cable of the

selected kind, spliced in for use, costs three-fourths as much as the 50-pair; that is, the 50-pair costs one-third more, and we contemplate no cheaper way of supplying an additional 25-pair on any run at a later date than to put up another cable on another messenger at the same cost as the first. By making all the runs 25-pair, we start out by saving enough (33/100) to place the addition to six of the twenty runs. If this saving is invested in profitable instead of idle property, it will amount in four years to enough to add to ten of the runs, in seven years to enough for 13, in ten years for 17, and in less than 12 years for the entire 20.

If the question is of choosing between a 25-foot chestnut and a 30-foot cedar pole line, the latter costing 75 per cent more, the last column of the table applies. The saving from the cheaper construction will rebuild that line in three years, or replace it with the cedar line in nine. Thus, if there is no prospect of such a load within a very few years as will shorten the life of the cheaper line, it may be economical both immediately and ultimately to build cheaply. Examples of the economy of such a course are appearing in the rural construction of the company I am working for. Even though we have been obliged to renew several leads less than six years old, the development has often been in directions that could not have been foreseen when the plant was laid out, and the farmers were skeptical of the telephone's utility. In a country where timber does not grow, but is carried two thousand miles across seas, I followed the plan of spacing the first poles set for a single line at double the best distance for poles bearing cross-arms; then when more arms became necessary, the missing alternate poles were supplied. Poles are sometimes set upon routes whose continuance is doubtful —the street may be diverted or boulevarded, or the underground limits extended to take it in; in such cases cheap construction may be best.

If a copper toll line should cost two and a half times as much as an iron circuit which would provide acceptable transmission, the excess cost of the copper plus its interest would build two more iron circuits after three years; the excess interest alone, one iron circuit after five years. If the junk value of the copper on the poles is two-thirds of its cost on the poles, the saving by putting up iron is almost sufficient to offset the junk value at the start. The depreciation of a copper line put up and taken down after eight years has cost sufficient interest to pay for two iron lines. It is clear that preference of copper over iron for toll lines must rest on some other grounds than its life and scrap value.

To meet another problem of the engineer I cannot do better than to paraphrase some of Wellington's paragraphs. In all but the rarest cases it would be absurd to claim that no allowance should be made for future growth of traffic, and often it should be a large one. Nevertheless, while large allowances for future traffic are almost always justifiable, it is for practical reasons so dangerous as to amount to folly for even a prosperous corporation to look ahead more than from three to—at most—ten years for the "rapidly increasing traffic" which is to justify an increase of present expenditure over what the prospects of the present and the immediate future will justify. To show why this is so I append a table giving the present value or present justifiable expenditure to save one dollar at the end of any given period at the ten per cent compound interest rate which we are considering. It follows from this table that the value of a given betterment for a given immediate earning which is to exist only in the future, will be that sum which at compound interest will produce one dollar when the assumed earning comes to exist. If, for example, we expect the earnings to double in seven years, we may spend for a betterment worth one dollar to the present earnings, one dollar plus the sum which will produce one dollar at the end of seven years, or 51.3 cents. Under this condition we should be warranted in spending half as much again to provide for the double demand at the end of seven years.

Years.	Dollars.
1	$ .909
2	.827
3	.751
4	.683
5	.621
6	.565
7	.513
8	.467
9	.424
10	.366
11	.351
12	.319

All this is undeniably correct in theory, except that it understates the case; the prevailing consideration being such that the worth of the indications of the table lies in their fixing a maximum which should never be exceeded.

If we then conclude that investments in general are not to be made for expectations more than a few years ahead, we may point out two particular exceptions, namely, those forms of investment, as in buildings, which are valuable independently of their telephone uses, and those opportunities, as in rights-of-way, which may not come again. As special considerations against building too far in the future, we have our lack of knowledge as to the changes which may come about in the classes of business and residents in given districts, the changes in the art from future inventions, the effects of competition upon the plant. The last point is mentioned because we know engineers who are proceeding to lay out plants with the view that there will be no competition after a few years. The risk of failure in prophesying the real estate changes is exemplified in the statement we often hear, that if a telephone engineer could lay out his plant perfectly he would not be in the telephone business, but would be enriching himself in the real estate business. In the matter of inventions it has been my personal fortune, in the telephone business and out of it, to be associated with enterprises which have gained advantages almost year by year from inventional progress. Perhaps I am led by this experience to put too much stress upon the possibilities of the future, but it does seem that these possibilities ought to be taken into account in any telephone planning. The competitive condition which now exists was not foreseen ten years ago, if it was five years ago. Every one can tell of many large movements in business and residence centers. As affecting cable layouts we have seen within a few years past the changes from open wire to multiple cable distribution, and the experimentation with party-lines. This last I do not think is yet settled to a standard practice.

Another use of an interest table in calculation may be illustrated by this example: Suppose the life of a switchboard is estimated at twelve years, by which time the original and added sections will all be discarded; how much can we afford to spend at any given time to effect an annual saving for the limited period? The following is a table showing the justifiable present expenditure at ten per cent to save one dollar per year for a given number of years.

Years.	Dollars.
1	.91
2	1.74
3	2.49
4	3.17
5	3.79
6	4.36
7	4.87
8	5.34
9	5.76
10	6.14
11	6.50
12	6.61

(The amount rises at a diminishing rate until theoretically the table must be extended to infinity before the amount reaches ten dollars; that is to say, it is only worth twice as much to save forever as for seven years only.)

If the saving is to begin at once, and extend six years, then the present justifiable investment is $4.36. If it is to begin six years hence and extend a like period, a calculation from the previous tables gives $2.46 as the present justifiable investment.

These tables are interesting as showing the value of the prompt obtaining and turning over of all funds, as well as the saving of outgo. To some particular considerations on this point I will come later. It is as true now as in the days of the first man who braved the lightning's current on an insulated line, that "A quick sixpence is better than a slow shilling."

In such a meeting as this I ought not to pass an allusion to Benjamin Franklin without expressing a wish that our engineers might emulate his scientific care, our managers his thrift, our cashiers and contract agents his diplomacy, our spokesmen his strength of expression, our financiers his capacity for persuading funds out of the most unwilling of lenders, and all of us his zeal for knowledge.

I will try to point out some applications of the foregoing considerations without attempting any demonstration in figures.

The cable distribution is the most costly part of an engineer's work. A local telephone company may stand or fall with its degree of success in getting cable into those parts of its exchange district where cable will be in demand. The multiple-cable distribution methods somewhat widen the narrower limits within which cable distribution is flexible. The subway and pole lines must be so far complete that there is little demand for their flexibility. The switchboard terminals and the subscribers' lines and instruments have a large degree of flexibility.

Except in the very largest cities, the telephone company's revenue comes from nothing so much as from the rental of the equipment and the circuits which the engineer puts into place. That is to say, the company is spending much more to rent usable telephones than to provide the actual service. Accordingly the company's revenue depends in a great measure, as do its expenditures, upon the business judgment and skill of its engineer. We can offer few considerations of economy in the direction of cable distribution other than the general caution that the subject is worthy of the best study.

The mistake is common of building for trial regions or trial toll routes with the same high and costly standard of construction as for assumed profit-producing enterprises. In building along country roads where the farmers begin by being content with one to two dozen parties on a line, the economy for the telephone company may be to put up its lines in almost the very cheapest form. If the users are content with this class of service, as they may be content to stay at home during the muddy season, and to shelter their machinery in the orchard, they may not object to making their telephone calls on fine days, and to expect long delays in clearing trouble. When they become educated to the value of good service, they may be willing to pay the costs of good service.

Unnecessary investment is sometimes made for bringing up the standard of transmission for every subscriber to that needed for truly long-distance talk. This may influence extra expenses in instruments, lines, and switchboard. In small communities where very little talking is done over any but short lines, there is seldom any hardship in requiring the occasional or accidental toll-user to come to the company's office, or in giving regular toll users the use of exceptionally good lines, instruments, batteries, and cords. Sometimes the best circuits from switchboard to switchboard are made useless for long-distance talks by the parties on the respective subscribers' lines keeping down enough receivers to weaken the transmission. If the community's habit favors listening on such lines, the telephone company can do little to prevent it.

Let us suppose now that the engineer has laid out a new telephone plant in a city and has made his estimate for its complete building in the sum of $800,000. His employer informs him that no more than $600,000 is to be had for the preliminary construction, and directs him to reduce his estimate to that amount. He then has the problem of determining the most economical places to cut the construction. Let us see whether we can generalize upon this problem, bearing in mind, of course, that our generalities cannot apply to all cases with varying conditions.

We may begin by assuming that the company will have additional funds available later on, or otherwise it would hardly enter the telephone field. The principle upon which we may go is that the first investment should be, just as far as practicable, in such form as to bring the earliest returns, without, however, involving extra high charges in future additions.

The greatest mistakes would be in making the building, the switchboard, or the subway too small, unless it is foreseen that additions could be provided with growth without extraordinary expense.

The greatest saving, if good business judgment would permit, would be to omit entirely, or supply meagerly, some complete section of the exchange territory, as a suburb, a special factory or railroad district, the farm-line extensions, and regions of uncertain pay or of negligible influence. It may be that a study of the classes which the company expected first to serve would disclose others segregated more or less into districts of their own, or even widely mingled with the general population, which could be disregarded for the time being, as of those having race, church, social, or business affiliations likely to lead them to apply for telephone service pretty much as a class.

Possibly some portions of the plant, as poles, ducts, or buildings which the first estimate contemplated constructing, could be leased in part or all from others, with perhaps an option to buy. Possibly some of the subway work could be postponed, and poles allowed to serve the purpose for sufficient time to more than offset the cost of their setting, depreciation, and removal. In the subway work itself it may be that some of the manholes could be omitted, with the idea of providing them later on, when their cost under most forms of paving is not so much greater than it would be for putting them in originally.

Into sections where branch exchanges may ultimately be required, a study might develop that sufficient cable for the ultimate trunking would suffice for a while to take care of these subscribers. This would not apply so much to a district at present thickly settled, as to a newly opened one that promised to grow into good territory.

The switchboard costs should be studied carefully to strike a balance between buying too far ahead and providing economical means for affixing at least the earlier additions. Some forms of switchboard are constructed to permit adding small sections as required, after the manner of the unit type magneto switchboard positions. With these, of course, the problem of additions is simplified. Care should be taken to have the most economical balance between the outside capacity and the switchboard capacity, which means that the former should be somewhat less than the latter.

Under our principle it is desirable to have that investment which does not begin earning from the start in such form that it may be utilized for revenue at the minimum expense as additional applications or funds are secured. This means that unless the amount available for investment is absolutely limited, its best use will be in making ready the cable terminals, rather than in the accumulation

at the expense of the cable terminals of a stock of line, drop, and interior wire, and of telephones. This latter can be bought in small quantities as needed. The advance payment from a subscriber will go a large part of the way toward the investment necessary to establish his circuit if that circuit is already complete out to the cable box.

I hesitate to suggest the saving in first cost which may come from the locating of a cable-box short of its ultimate economic situation, or of omitting multiple or other cable-boxes in the expectation that growth will be sufficiently slow to permit the stringing of open lines at a smaller investment that supplying cable. This because of the excess maintenance cost on open lines and the more frequent interruption. Working on a plant which was originally built with a large amount of open wire construction, and on which there has been a great deal of replacement of material to provide for a heavier voltage and higher standard of service, I have been able to compare maintenance costs on some old and some new forms of construction, and on varying grades of material. I should not wish anything I may have said to be construed as favoring shoddy material or unskilled workmanship, and only as favoring cheap construction where that is the cheapest under all the circumstances. It has seemed well, for a particular purpose, however, to throw the emphasis upon the side that is not so often considered.

With the engineer, in a considerable measure, rests the quality of the service which his company will provide. The re-active effect of that service upon his work is important, though no less important to the other departments of the company's business. I will close by reference to some of the costs affected by the quality of service. If a higher standard is to be given it will need extra costs in supplying good equipment and lines, more careful patroling and inspection, a well-planned and well-supervised maintenance, as well as operating force, more calls to handle and more wear on cords and other perishable portion of the equipment. Poor service will display itself on the cost-sheet in more visits to get proper work done because of the difficulty in keeping the maintenance force to a strict accountability for good results; more needless visits to subscribers with general complaints and demands for unnecessary attention; greater difficulty in the procurement and discipline of operators, and possibly a larger number; more difficulty in obtaining and retaining subscribers, and consequently more moves, and more take-outs for non-payment and more rebates; greater cost of collecting; less of public good-will, and consequent disadvantage of obtaining rights-of-way and other privileges; and more time of officers in handling complaints.

H. T. Cedergren—An Appreciation.

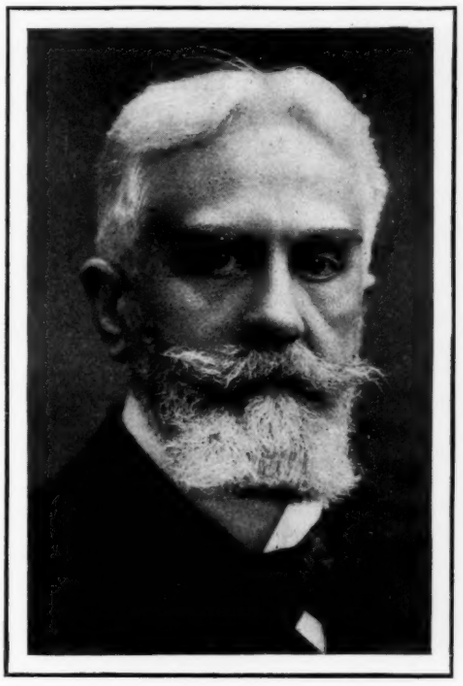
With the death of H. T. Cedergren, Europe has lost its most prominent and successful telephone operator and, at the same time, its Independent pioneer and most aggressive advocate of competition.

When his call came, on April 13, it was not entirely unexpected by those who knew him closely. He had for some years been suffering from a serious heart trouble, which lately forced him to retire almost entirely from personal activity in the management of the vast telephone undertakings he has organized and, to a large extent, owned.

Mr. H. T. Cedergren was born at Stockholm, Sweden, Dec. 31, 1853. From his birth a weak, sickly child, he was not expected to live, and was unable to attend school regularly. His early education was accomplished by private lectures. As he grew older his remarkable will power and indomitable energy seemed to coerce the frail body into development and strength.

Graduating in 1875 from the Royal Technical Institute as civil engineer he turned his attention first to house building, and started later a brick factory.

When reports came from America, in 1877, about the inventions of Alexander Graham Bell and Elisha Gray, Cedergren installed the first working telephones in Sweden. The line was between his office and his residence. In November, 1879, the International Bell Telephone Company obtained permission from the city to install and operate a public telephone system in Stockholm. This system grew rapidly, in spite of the excessively high rate of $67 per annum. The Bell company refused to listen to the urgent demands for lower rates. Having carefully studied the possibilities of the public telephone as a time saver, as well as the local conditions, Cedergren proved by figures



H. T. Cedergren.

to the officials of the Bell company the folly of retarding the growth of a coming necessity by too high rates. He was coolly told he was a dreamer, and to mind his business. Satisfied that his figures were right, Cedergren, with considerable difficulty, organized a new company, April 13, 1883. The first paragraph in the by-laws stated that the object of the organization was to give public telephone service "at rates as low as possible consistent with the safe existence and conduct of the business." The undertaking was based on an unlimited service rate of $26.80 per annum.

Contracts were taken for 1,170 subscribers, and a switchboard and telephones were ordered from L. M. Ericsson & Company. In July, 1883, the exchange was opened, with 332 subscribers connected. May 1, 1884, the first multiple board was installed, and 2,600 subscribers cut over. The system grew rapidly and franchises were secured in neighboring towns. Toll lines were built. The State, owning the telegraphs, began to fear the growing possibilities of the telephone system, and succeeded in restricting the territory in which the company was allowed to operate. Finally a franchise was granted the new company by the State to operate within a circle having a radius of 42 miles from the center of the capital, but the company must sell all the property outside this territory to the State. In 1885 the company had 4,832 subscribers or 22.5 for every 1,000 inhabitants. At the same time Berlin had 4,248; London 4,193, Paris 4,054, and Copenhagen 1,336 or 0.9, 1.4 and 4.9 respectively for each 1,000 inhabitants.

The Bell company was unwilling to meet the competition and, unable to exist, sold out to the new company.

In 1889, when the new company had over 7,000 subscribers, the State started operating in competition at exceedingly low rates, giving unlimited metallic line service for $17.40 per annum. To meet this Cedergren divided his service up in different classes, and managed to maintain his superiority both in numbers of subscribers and high grade service.

In 1890 the company started converting the whole system to metallic lines, and this remarkable feat was accomplished with the same switchboard, while in full operation and without any interruption of service. This work was completed, with 10,436 subscribers connected, in 1894. At the same time the first aerial lead cables, of the company's own design, were introduced. In 1894 the first underground cables were laid.

In October, 1890, intercommunication was established between the company and the State system, a charge of 2½ cents per call being made each way. This contract was continued in force until July, 1903, when new terms stipulated by the State for continuance were unacceptable.

A new building was erected for the Main Exchange, and a switchboard having a multiple capacity of 17,000 lines was installed in 1897.

At present the system at Stockholm proper is divided into one main and six branch exchanges, the respective capacities of the branch offices being: 7,200, 6,600, 5,000, 4,200, 2,400, and 2,000 or a total capacity, including the main, of 44,450 subscribers. The company's operating territory includes, except Stockholm proper, four smaller towns and, besides, 161 country exchanges with a total of 9,062 connected subscribers.

Total connected subscribers within the whole territory amounted in December, 1908, to 50,988; of these there were within Stockholm proper 42,300. Comparing the ratios of telephones to inhabitants, it is interesting to note the following table:

Stockholm	one telephone for every	6.6 inhabitants
Chicago	one telephone for every	11.2 inhabitants
New York	one telephone for every	12.5 inhabitants
Helsingfors	one telephone for every	15.1 inhabitants
Jamaica	one telephone for every	16.5 inhabitants
Copenhagen	one telephone for every	16.8 inhabitants
Berlin	one telephone for every	20.6 inhabitants
Paris	one telephone for every	42.39 inhabitants
London	one telephone for every	46.11 inhabitants

The capacity of the exchanges being almost taken up, a new main exchange is being built, which has a multiple capacity for 30,000 subscribers. The board is arranged so that this capacity may be brought up to 60,000. The system used is a separate answering section, and flexible multiple with auxiliary cord system.

The different classes of service, all subscribers having direct metallic lines to the respective exchanges, are divided as follows:

Unlimited service over the whole system, $21.45 per annum.

Unlimited service over the whole system, but combined in pairs (so that when one is using his line the other's line signal is cut off), $16.10 per annum.

Special business telephone, with 600 free calls per annum, $12.00; above 600 calls 1¼ cent per call.

Residence telephones with 600 free calls per annum, $9.65 per annum; above 600 calls, 1¼ cent per call.

Besides these, there is a class of subscribers designated by a star in the list, to which all special residence subscribers have free connections. The subscription for this class is $26.80 per annum.

When the Bell monopoly expired in Russia, new franchises were offered to the bidder of lowest rates. Mr. Cedergren promptly went over the ground, carefully made complete estimates in detail, and was successful in securing 18 year franchises for Moscow and Warsaw.

At both these places Cedergren installed modern underground systems and common battery switchboards which had a capacity for 34,000 subscribers, 15,000 being installed immediately. L. M. Ericsson apparatus was used exclusively.

It is interesting to note the enormous growth of both these plants immediately they come under Cedergren's regime. After 20 years of the usual Bell policy, the Moscow company in 1900 had 3,058 grounded line magneto subscribers. In January, 1909, Cedergren's company had increased to 22,638 subscribers. In 1900 at Warsaw the Bell company had 2,331 subscribers, and the Cedergren company increased this so that 15,861 subscribers were connected in 1909.

When the L. M. Ericsson Company secured the franchise for the Federal District of Mexico, Cedergren's experience from the Russian plants was used to a large extent in building this system on an ultra-modern and up-to-date basis.

For the last couple of years Cedergren's representatives have been located at Constantinople and also in South American cities studying the local conditions with a view to securing franchises. Cedergren was a frequent visitor to this country, and traveled extensively in other countries, always studying and looking for new discoveries to improve his systems.

Possessor of a mind brimming over with ideas, resourceful to a degree, he excluded the word *impossible* from his vocabulary. He had a remarkable faculty for selecting the new improvement that had real practical merit, and studied every side and phase of a new thing, trying it first before it was adopted on a large scale, thereby avoiding fatal and expensive mistakes. A fascinating and gifted personality, he knew how to secure for his associates the best talent, and, always first where work was hardest, he kept their admiration and loyalty. Widely known and respected, the loss of this pioneer, an incessant and fearless fighter for the highest development of the art on a safe and sane basis, is deeply felt in the telephone world and particularly so in the organization where he was the inexhaustible source of energy and initiative. He has built himself a lasting monument in proving that efficient service, using the best apparatus and material obtainable, not only is possible at reasonable rates, but is very profitable. There was no high finance in his organizations. They were built soundly, and to last.

Electrical Engineering Studies at the Massachusetts Institute of Technology.

The cause of electrical engineering research and the advanced instruction of graduate students in electrical engineering has been advanced by the appointment of Dr. Harold Pender to the Professorship of Theoretical and Applied Electricity, which is connected with the Department of Electrical Engineering at the Massachusetts Institute of Technology. Dr. Pender is a graduate of Johns Hopkins University and took the degree of Ph. D. at that University in 1901, under the direction of Professor Rowland. He thereafter taught for a year and a half, during which period he completed the classical experiments of Professor Rowland which demonstrated the magnetic effect of a moving charge of electricity. Poincaré, the eminent Professor of the Sorbonne, in Paris, and a member of the French Academy, having suggested the desirability of these experiments being performed in Paris for the benefit of French scientists, the Carnegie Institution, of Washington,

arranged with Dr. Pender to go to France for the purpose. Upon returning from France, where his experimental demonstration had been received with acclamation, Dr. Pender went into the employ of the Westinghouse Electric Company and he has since been in regular engineering employ. He is recognized as notable in his work in mathematical and experimental physics. His teaching at the Institute of Technology will consist of a course for third year undergraduate students and courses for graduate students in the more advanced theories of electric current flow and the electric transmission of power, in addition to the direction of experimental research which is carried on by advanced students.

The advanced lectures on the organization and administration of public service companies, on the design of power stations and systems, and on electrical measurements heretofore carried on by Professor Jackson, Professor Shaad and Professor Laws will be continued by the same professors. This organization makes a remarkably favorable one for graduate students of adequate preparation who propose to spend one, two or three years in advanced study of the greater problems of electrical engineering.

As indicating the trend of electrical engineering study at the present time, it is notable that forty per cent of the students just graduated from the electrical engineering course at the Massachusetts Institute of Technology already bore degrees of Bachelor of Arts or Bachelor of Science, conferred, as a rule, in classical or literary courses. The colleges conferring these degrees are spread over the land, from Nova Scotia to the State of Texas and the State of Washington, and include some of the most important Universities of the East and the West, besides a number of the lesser colleges.

How the Operator Got Even.

A story on Representative Brownlow of Tennessee, says he was trying unsuccessfully, one day, to reach the White House by telephone. Finally, Mr. Brownlow, ordinarily a patient man, went up in the air.

"Look here," he cried to "Central," "quit this foolishness. If you can't get me the White House give me some place where I can at least talk to my intellectual equal."

There was a silence for a moment and then over the wire came a good loud "Hello!" in a man's voice.

Mr. Brownlow was much relieved.

"What place is this?" he asked.

"This," the voice responded, "is the government hospital for the insane."—*Southwestern Telephone News.*

Good Report from Independent Company at Santa Monica, Cal.

The Santa Monica Bay Home Telephone Company, of Santa Monica, Cal., is one of the prosperous Independent telephone companies of the Pacific Coast, and, as is shown by a recent statement of the company's business, is enjoying a very substantial and healthy growth. A little over a year ago, in January, 1908, when the present manager, Albert Skalowski, took charge of the system, the company had but 725 telephones, while the competing company had over 1,000. At the present time the directories show that the Independent company has over 1,100 subscribers on its list, and the other company but about 800. During the month of May, in one section of the city, 40 telephones belonging to the competing company were ordered out and those of the Home company subscribed for.

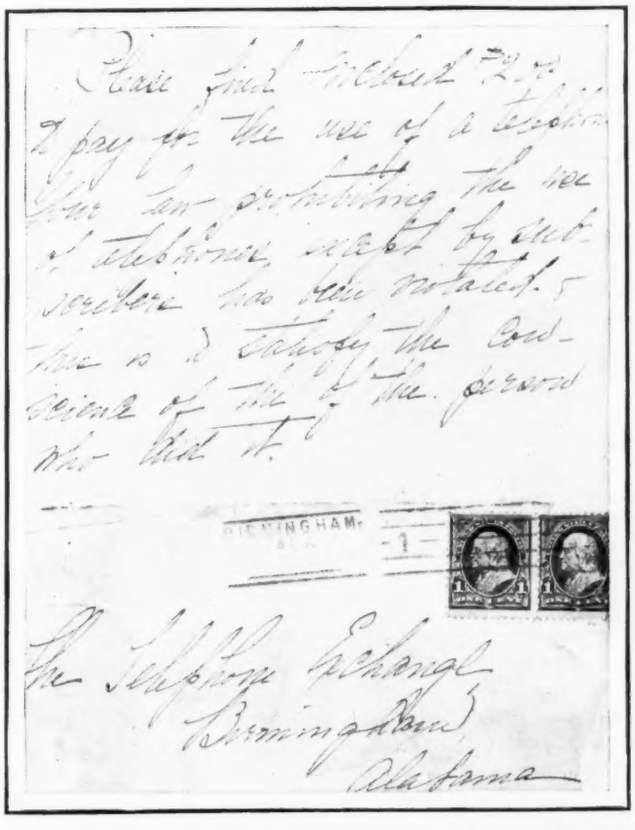
According to the company's statements, earnings for May had increased $93.70 over those of April, and in two years' time the increase in business has been about 35 per cent and the decrease in expenses about 15 percent. The company is paying a dividend of 4 percent, and during the first part of June 300 shares were offered to the stockholders, which, by the end of the month, were all taken up.

State Has Sole Power to Annul Charter.

At Louisville, Ky., the Cumberland Telephone and Telegraph Company has been successful in its two suits against the city in the Federal Court. The first was when Judge Evans sustained the application for a temporary injunction against the city to prevent it from putting into effect the ordinance recently passed by the general council repealing the charter of the Cumberland company. The second was when he granted a temporary injunction restraining the city from enforcing the $5.50 rate ordinance, which went into effect March 6. The court held in its decision that the Cumberland telephone company was operating in the city under charter granted by the state, and that the city had no power to repeal this charter unless given power to do so by the state.

A Conscience Letter.

Telephone companies have suffered, to some degree, from the popular error which leads some people to believe it is not a sin to take unearned money from large corporations, although not so much as railroads. It is said that at Washington one of the most interesting things shown to the tourists is the exhibit of "conscience letters" from persons who have improperly possessed themselves, at one time or another, of funds belonging to the government, and returned them with explanations. Public service corporations are not so likely to receive conscience letters, however. In fact, the one here reproduced is the



"Conscience Letter" Received by a Telephone Company.

only one known to have been received by a telephone company and merits the interest attached to rarities, as well as being a novel exhibit of the working of the mind of the sender after the lapse of time.

Independent Toll Lines in Indiana.

Part of the admirable work which has recently been done by the Independent Telephone Clearing House, of Indianapolis, Ind., under the management of Mr. W. J. Coffey, is the preparation of a large scale toll line map showing Independent connections throughout the state. The map is very large, well printed and makes an imposing appearance, although the size of reduction which had to be employed makes the accompanying reproduction somewhat faint, with names of many towns obliterated. As is realized by any one who has ever attempted to compile the necessary data for a map covering a large section, and including many separately owned lines, the work represented in the undertaking is enormous, and great credit is due Mr. Coffey and his staff for the ability, energy and persistency which has enabled them to turn out so useful a work. It may be stated that full-sized copies of the map may be obtained by Independent telephone men at a very moderate price from the Independent Telephone Clearing House, Indianapolis

Independent Toll Lines in Southern Indiana, as Shown by Clearing House Map.

Found in a Directory.

The following, found in the directory of a small southern telephone company, is decidedly a work of art:

RULES, INSTRUCTIONS AND IMPORTANT SUGGESTIONS.

Don't use the telephone during a thunder storm. Obey this rule and your 'phone will remain in good shape and you will not get hurt.

To Answer: Don't say hello. That means less than nothing. Simply lift your ear piece to your ear and say Johnnie Brown at 14, if that happens to be your name and number. Always ring one short ring when through talking; this notifies the operator that the line is open and can be used by some one else.

If operator is slow to answer, don't get mad and say hard things to them, this only complicates matters, and unless things are just right with the next one that calls, the operator may not be pleasant and your harsh words will thus be carried along from one to another all day long. The operator has over 200 subscribers to look after and you hardly appreciate the amount of work she has to do.

Non-subscribers should not use the 'phones on these lines without paying the subscriber, as we charge the subscriber for all such communications. We have no free service for any one except the subscriber and his immediate dependent family. Where in business house only free when on business of direct interest to that concern.

One minute is long enough to talk, over three minutes will be charged for extra.

We will, however, use some judgment in enforcing this rule. The purpose is to cut out useless gab and childish talk. Business always has the preference.

All the rates over the company's lines are for a conversation of three minutes and for each additional minute you talk you are charged extra in proportion to the distance. Remember this and don't kick when your toll bill is presented.

Report all 'phone and line troubles to the Manager. He

is always ready to give you a hearing. If the line is broken and you can make a temporary connection with a piece of wire we will appreciate it. Don't try to fix your 'phone unless you want them out of fix forever—in this case you pay for them. The 'phones are rented to you, not sold, and any damage they receive while in your possession we will expect you to pay for.

Operators do not have time to carry on conversations, please do not expect it of them. Don't make complaints to them, they are busy and cannot give you any satisfacton. Call the Manager or General Manager.

All toll bills are due and payable on demand. Our statement is a demand. Rents on party lines due and payable quarterly in advance on the first days of January, April, July and October. Rents on private lines due and payable monthly in advance. Deferred payments subject to interest charge. Subscribers allowing their bills to remain unpaid for 60 days forfeit their rights as subscribers and the penalty is the removal of the telephone.

Using vulgar or profane language is a punishable offense under the law and certainly unbecoming to men. A gentleman will not do it.

Always hang up your receiver ear piece down when through talking, otherwise your batteries will be exhausted and your bells cut out. Ring off by giving the crank one turn.

For toll rates call on Central.

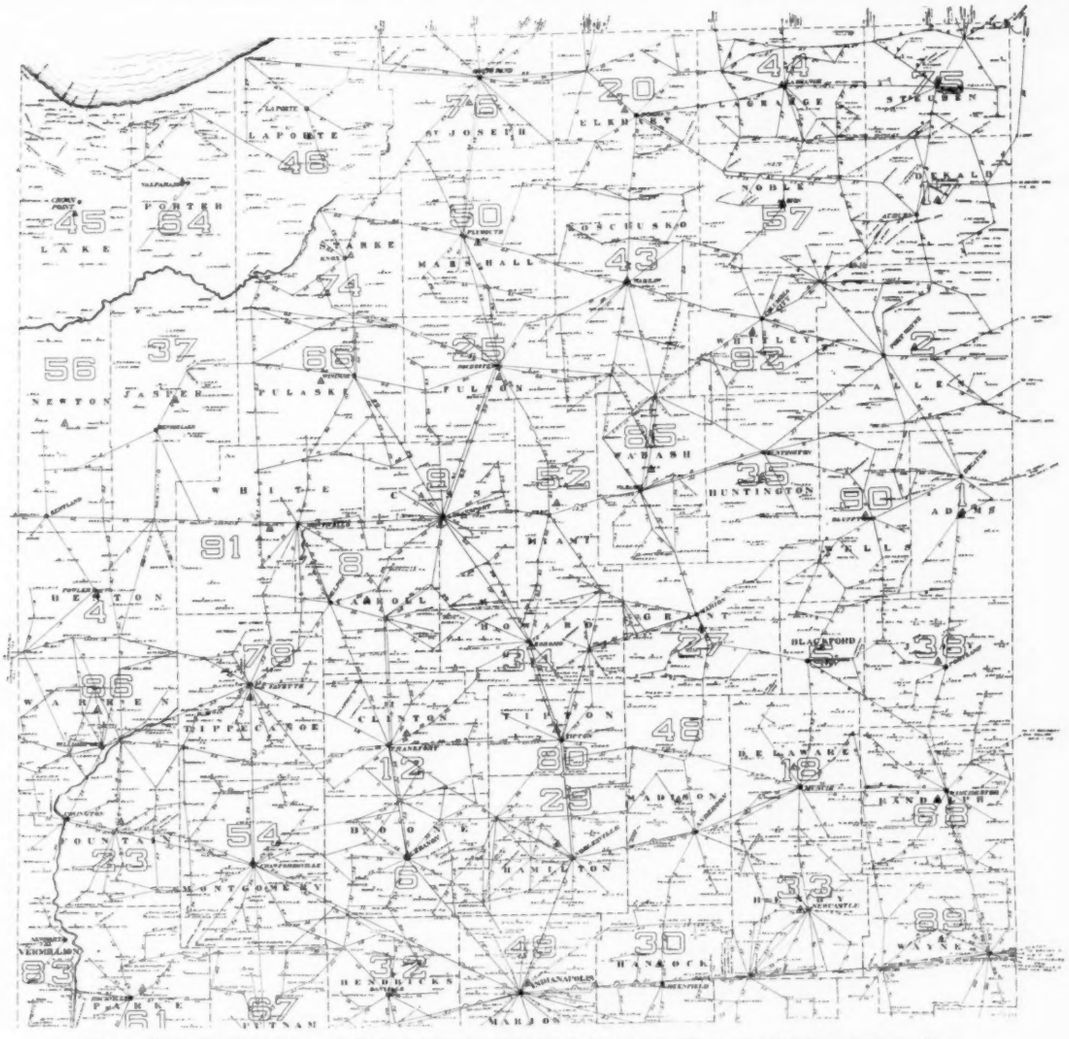
In dry weather it sometimes happens that the earth around the ground rods gets very dry. By digging a small hole around them and pouring on two buckets of water twice a week you will greatly improve the service over your telephone.

All subscribers are required to call the attention of Central to any message originating at their place that should be charged for. Any failure to comply with this rule looks like an attempt to defraud whether intentional or not.

We welcome inquiries in reference to telephone service of any kind. We want to see a Mutual telephone in every house in Emanuel county.

It is a misdemeanor to shoot off insulators or to in any way damage, molest or interfere with the lines of this company. A reward of $25.00 will be paid for arrest with proof to convict any guilty party.

The use of these lines for eavesdropping or conveying the sounds of music of any nature, phonographs, pianos, organs, mouths, crying children, etc., is strictly prohibited. Eavesdropping is very unmanly and unladylike and should not be indulged in. If you must do it please hold your hand over the transmitter so that your presence will not be so plainly felt. Parents should not allow their children to interfere with the telephone in any way. You may think we do not know who you are, but sooner or later it comes out who is the guilty one, and rest assured, we never feel good about you any more. You annoy your neighbor, make a fool out of yourself and injure the company by acting in these unbecoming ways. Central is required to listen at times and has instructions to disconnect any one who makes improper use of the lines. If you are persistent in making a nuisance of yourself then the penalty is removal of your telephone without further notice.



Independent Exchanges and Toll Lines in Northern Indiana—Part of Clearing House Map.

Telephone Reminiscences*

By C. E. McCluer

At the time of which I now write the city of Richmond was engaged upon and greatly interested in the construction of a palatial City Hall or Municipal Capitol, which like many another municipal palace was costing much more than the estimates provided for. Soon the city officials more immediately interested, and their chief adviser, the city engineer, began to consider the question of equipping the new structure with an up-to-date inter-communicating telephone system, entirely separate and distinct from the city exchange, but with trunk line connections therewith for city and long distance communication. A special committee was appointed by the city legislature to look into the question and formulate some plan of action. In view of the fact that the building bid fair to cost almost double the estimated figures, the committee felt that it was incumbent upon them to drive as close a bargain with the telephone company as was possible. They, therefore, as a preliminary, asked me to make them a proposition for such an installation as I thought would meet the requirements of the city. I did have some ideas on the subject and was inclined to suggest such a system as would tax the city treasury and the telephone company but to a limited extent, but realizing that the new bosses in Boston were taking notice, I concluded I had better refer the matter to headquarters, with my suggestions. Without canvassing or alluding to my proposition, I was curtly directed to ascertain from the committee just what they wanted, and report. Then began a desultory correspondence that dragged along through twelve or eighteen months before the matter was finally settled. At first the committee did not themselves know just what they wanted, and they would almost certainly have accepted my original proposition, which while protecting the interests of the telephone company, was, I think, wisely liberal in that it was designed to strengthen the friendly and business ties between the two corporations.

This application of the municipal government for city hall telephones was made, if my recollection is not in fault, during the early summer or spring of 1893, while the new capitol was still in the hands of the architects and builders. The system of delay and non-committalism adopted by the Southern Bell authorities in responding to the communications of the chairman of the committee and the city engineer, proved exceedingly vexatious and distasteful to those individuals and their official brethren, and the tone of their letters gradually waxed warm and threatening, until they at last largely increased their demands and began to utter threats. I have access to only a portion of my letter files of those days, so I am compelled to trust largely to my memory to guide me in this recital, but of the main facts I am sure.

Under date of January 22nd, 1894, after the city hall telephone question had been dragging its slow length along for many months I wrote as follows:

"I would not of course think of conceding Col. Cutshaw's demand for *free* telephones, but I think it would be good policy for us to make a counter proposition looking to a material reduction in our municipal taxation and a favorable settlement of the questions which have been so long at issue between the city engineer and ourselves with regard to our rights under our franchise. Possibly by thus 'throwing a tub to the whale' in the shape of a concession of rates for the city hall we might secure a reduction in our taxation, and avoid any further trouble regarding our right to plant poles and string wires thereon. If this can be done I think we would be justified in making a considerable concession.

Had this controversy come up under Western Union auspices I would doubtless have been permitted to handle it in my own way, and I am sure my way would have saved the Southern Bell stockholders many thousand dollars. But the Boston disposition to discredit and sit down on me had by this time become unmistakably pronounced, and I did not dare to lift my hand or draw an official breath without the sanction of my superior officers. Hence I could only in a half-hearted manner suggest the policy I deemed best, knowing full well it would be haughtily spurned.

On February 23rd, I wrote in another letter:

"* * * Such a tax of even $1.00 per pole would cost us a great deal more than the free telephone exchange service, and a refusal on our part to meet the views of the committee would undoubtedly place us at a disadvantage in case we should ever have occasion to fight an opposition company. I therefore feel strongly inclined to surprise the committee and capture them outright, by going further than they think we will do and exceeding Mr. Turpin's extreme demands by the provision of any number of exchange stations that may be required, free. Such a liberal course on our part would, I believe, have an excellent effect, and I feel quite confident would cause the postponement indefinitely of any increase in our municipal taxes and at the same time put us in such close and amicable relationship with the municipality, that a competing company would find it extremely difficult if not impossible to secure a franchise under which capitalists would care to invest their money."

The Mr. Turpin alluded to was the president of the board of aldermen and an influential man, who had taken up the cudgels vigorously for our chastisement, and who subsequently proved to be one of our most vigorous and doughty antagonists. The sequel, under his able manipulation, seconded by the all-powerful efforts of the city engineer, proved that my apprehensions were not groundless. Like a malignant disease that is readily amenable to vigorous treatment in its incipiency but which becomes later intractable and deadly, my simple remedy applied when first suggested would have aborted the municipal attack and saved the Bell company from the deadly and fatal complications that set in later. The trouble with the Bell people was that they were so stiff-necked and so set in their ways, that they refused to bend a solitary iota from the perpendicular until they were broken. Then they bent to the ground. That was not my policy.

Then ensued several weeks of further inaction on the part of the company, interspersed with my repeated suggestions relative to making a proposition, no action whatever being taken or response made to the increased demands of the municipal authorities. Demands that had grown from a reasonable reduction for the telephones and service for the city hall, including an inter-communicating system with a few trunk line connections with the company's exchange, to a full Richmond exchange station for nearly every office in the city hall and service

* Continued from previous issues of TELEPHONY.

from all of them with all Richmond stations at will, *gratis*. On July 24th, probably in response to a letter from Mr. Carson, in which he doubtless reflected the advanced position taken by the Boston officials, and their determination to withstand an attack, I use the following language:

"* * * I confess I am dubious about taking issue with the committee just at the present time. Any fight made by us now would certainly bring the telephone question to the front, and might have the effect of intensifying among our patrons the desire for reduced rates, and in case we are not able to maintain our position I presume it might be the worse for us."

I reckon I referred to the broken reed on which the American Bell officials were leaning at the time, the Berliner patent, which subsequently gave way under their weight.

While this controversy with the city engineer and the sub-committee of the grounds and buildings committee was dragging along we got into controversy with the councilmanic fire alarm committee and their able and efficient superintendent, with regard to the new central office installation which they desired to place in their new fire alarm headquarters in the new city hall. Much correspondence regarding the matter ensued, in which I was guided entirely by instructions from Mr. Carson. The fire alarm committee were not quite so radical in their demands as were the grounds and building committee, either at first, or subsequently. They were willing to pay for what they got at our current rates, but they did not desire to have forced upon them a lot of unnecessary apparatus turned out by the Western Electric Company, but preferred to buy from us such telephone apparatus as would meet their requirements, and install them according to their own ideas. I was instructed to make them a variety of propositions, all of them looking to the exaction of handsome profits as rentals on switchboard and other fittings, including, of course, the transmitters and receivers. Our people stubbornly refused for a long time to sell them even the call bells, spring jacks and other fittings, but insisted in furnishing a completely equipped switchboard under an annual rental contract. This controversy was like the one with the sub-committee on grounds and buildings, eked out for an unconscionable period, with the hope, I presume, of eventually wearing out the patience of the committee and superintendent, and inducing them to accede to our dictation. I find in my files a letter under date of October 18th, 1894, regarding this matter from which I make the following extracts:

" * * * Superintendent Thompson says that he would not dare to go to his board of fire commissioners with any such proposition as that contained in your letter under reply. He asserts that they would at once bring the matter to the attention of the council, and we would undoubtedly have trouble. * * * In view of all the circumstances, I think it will be advisable, if possible, to meet the views of the fire alarm commissioners and allow them to rent the telephones, purchase the call bells and spring jacks, and equip and arrange their own switchboard and central office, and operate and maintain it as an integral part of the fire alarm system."

The controversy with the municipality was approaching a crisis. Fearful of disaster if we did not make some concessions in order to quiet the bubbling of the municipal caldron, and believing that an explosion was imminent, I interviewed one of our counsel, Judge Holladay, who by this time had become paramount as our legal adviser, and on the 19th of October, 1894, I wrote:

"Have just had a talk with Judge Holladay. We recommend offer of fifteen free stations in city hall and a reduction of $20.00 per annum on present rates for as many additional stations as may be required. Present reduction of $10.00 on all municipal stations outside of city hall to continue. We also recommend allowing the board of fire alarm commissioners to arrange their auxiliary fire alarm system as a pony exchange according to their own ideas, but without expense to us. We make this recommendation in connection with the interests of the Richmond exchange alone, without reference to its possible effect as a precedent elsewhere."

Not being familiar with the conditions existing in other portions of the United States with reference to municipal engagements, our attorney and myself could consider only the situation which immediately confronted us. We, however, supposed that the American Bell people were afraid to establish a precedent that might possibly confront and place them in an unenviable position regarding possible controversies of a similar character elsewhere. But we coincided in the opinion that every case should be handled and decided on its own merits, and we deemed it the part of wisdom anyhow, to exercise the same degree of liberality everywhere that it was at all likely or possible that they would eventually be confronted by opposition. So confident however were the otherwise long headed Bell officials in the ability of their astute attorneys, headed by Messrs. Morrow and Fish, to maintain the integrity of the Berliner patent and thus give the company another long lease of telephonic monopoly, that they could not, or at least would not, admit the possibility of defeat, and I believe they adopted the same exasperating tactics everywhere, thus inviting general calamity.

One or two more quotations on this subject from my letters and I am done with it. On November 9th, 1894, I wind up a rather lengthy epistle with this:

"That there is some movement on foot looking to an opposition exchange in Richmond I am now satisfied, and I think we should by all means endeavor to allay any controversy with the municipal officers if we can do so without too great a sacrifice. I believe the council will willingly grant a franchise to an opposition company, and I greatly fear that an opposition company backed by capital and influence, will gain the support of a large number of our citizens and patrons. But we want to put ourselves in the best position possible to meet the opposition when it comes."

But I have quoted sufficient to prove my contention that I was overruled and sat upon throughout these controversies with the Richmond city government, and instead of being responsible for the loss of the Richmond franchise and the innumerable evils which accompanied that catastrophe, as claimed by Vice President and General Manager Gentry, I combatted in every way possible to a subordinate, the mistaken policy of our executive officers, and warned them of the results that would certainly follow their persistence in such ill-advised contentions with the Richmond city officials about non-essentials.

The result was what I predicted even more plainly and emphatically in other letters, and orally in numerous interviews with Mr. Carson. Refusing to the last to meet the views of the city officials in the mistaken belief that the courts would restore their monopoly under the Berliner patent, the last acts in the interesting drama came quickly. Our attorneys, and myself and staff, did all we could to stem the tide of adversity, but in vain. Vice President Merrihew even came down from New York and wrestled with the central figure in the municipal ranks, the city engineer, but with no better result, because no adequate concessions were offered. The sub-committee's report to the full committee on grounds and buildings

was submitted and adopted unanimously, as was the ordinance submitted to the council and board of aldermen by the committee on grounds and buildings, without discussion or amendment by those bodies. I do not think the Bell company had a friend on the floor of either chamber, but in order to save our faces and out of regard for my feelings, a few votes were cast against the revocation of our franchise. But it was carried one week by a large majority in the council, and the next week by a similar majority in the board of aldermen, notwithstanding that Maj. Styles, Judge Holladay and myself being granted that privilege, argued strenuously against such a consummation. But we might just as well have tried "to whistle down the wind." The municipality, in the persons of its servants, had been treated with chilling disdain, and insulted and defied, and we were doomed to defeat as long as we resorted to nothing more efficient than logical arguments. And neither our attorneys nor myself were at all inclined to descend to a lower but often more effective plan.

So the battle went against us. Our franchise required cancellation to be effective only on twelve months' notice. We therefore had a year in which to gird up our loins and decide what we were to do; a contingency that doubtless operated to allay any fears as to the ultimate outcome, in the minds of our people. Much might happen in that time. Immediately after the announcement of the result of the campaign against us, the opposition people showed their hand in the publication of their application for a franchise, which was promptly granted by the two houses of the municipal legislature and approved by the Mayor, and in a few weeks ground was broken for the construction of the exchange system of the Richmond Telephone Company, with the result that for years the Southern Bell company operated its Richmond exchange at a loss, and eventually had to buy out the opposition.

In the meantime other occurrences were happening elsewhere than in Richmond and the Old Dominion. Other portions of my territory as well as the second district, were attacked by the opposition microbe, and the telephonic war that is still raging was inaugurated. And other mistakes were being recorded in the history of the great Bell telephone monopoly, that was soon to be a monopoly no more. Independent schemes cropped up in several of my towns almost simultaneously with, or maybe somewhat in advance, of the loss of our Richmond franchise. And the newspapers, and the atmosphere even, were filled to saturation with rumors of opposition enterprises galore. But one at Durham, N. C., materialized under the fostering care of a leading and wealthy tobacconist, among the first if not the very first in my territory. Selma, Ala., however, was, I believe, the first Southern Bell stronghold to feel the weight of an opposition enterprise. Selma not being within my jurisdiction, I was not familiar with the circumstances attending that eruption of the enemy, and about my first knowledge of it came to me in connection with the proposed enterprise at Durham. During my correspondence with our headquarters office in New York regarding the Durham agitation, and while discussing the best way to meet the attack of the enemy, I was told that it had been decided to break down the Selma insurrection by according free service to all comers until the opposition enterprise should collapse. It would seem that there is abundant truth in the aphorism "Whom the gods would destroy they first make mad." It certainly looked to me that way when I learned of the insane policy that had been decided on for the suppression or destruction of the Selma opposition enterprise. And when it was barely suggested that mayhap it would be well to adopt the same method of fighting the opposition at Durham, I discoursed in this wise:

"October 12th, 1894. * * * Permit me to say now, however, that I shall be loath to adopt such an expedient as the suspension of *all* charges for service at Durham in order to break the opposition down. Such radical methods may be judicious and justifiable as between two wealthy corporations, as is sometimes done in bitter rate wars between opposition transportation companies, the patrons of both companies securing all the advantages of such cutting in rates, and only the two opposing corporations being saddled with loss. But it seems to me that in the case of opposition telephone systems like that of Durham, where the opposition is entirely local and was originated and is supported by local capital alone, the very people on whom we depend for patronage being financially interested in it, it will do us harm eventually, rather than good, and be calculated to increase the unreasoning popular prejudice against corporations. Certainly the sympathies of the citizens would be with their townsmen rather than with us in obedience to that principle of human nature that causes a spontaneous outburst of sympathy for the little dog in the fight. While we might possibly by such tactics "down" the opposition, we would certainly not increase our own popularity or entrench ourselves in the esteem of the community. On the contrary, we would most certainly incite a disposition on the part of the public to watch for opportunities to give us a black eye and encourage any other opposition scheme that might be started, even to the extent of inciting municipal or state authorities to acts of hostility against us. * * * These ideas occurred to me while briefly considering your statement about Selma, Ala., and I thought it was my duty to submit them to you in view of the possibility of similar action at Durham. Instead of adopting that plan, I would feel much more disposed to simply meet the rates of the opposition, not cut below them even, but adopt their figures, and then attempt to beat them by the character of the service. We could not be severely criticised for doing this."

Evidently the general superintendent came back at me with some strictures on my reasoning. At any rate a few days later, on October 16th, 1894, I addressed the following letter to him:

"I advised you in a letter dated yesterday morning that Col. Sharp had arrived at Raleigh on Saturday, and that he and Manager Glass proposed to visit Durham in company on Sunday. * * * Notice also Col. Sharp's suggestion that we had better pursue the same policy at Durham that we did at Selma. * * * Certainly. Were we to reduce our rates simply to meet those of the opposition, we would expect as soon as the opposition was closed up, to restore our rates again just as will doubtless be done at Selma when the opposition at that place is wiped out. But I really do not think we can be adversely criticised for taking the course I recommend. It would be just as well understood that we were reducing the rates for the express purpose of breaking them down, as if we were to give our service for nothing, but we could not be as severely criticised. In the one case we would be adopting a course pursued almost every day by people engaged in all kinds of business, but in the other case we would assume the position of a giant with unlimited resources at our command, fighting a weakling who could not of course be expected to stand up against us in any such warfare. Whereas, if we simply meet their rates we accord them the same footing that we have, and would be conducting an open, legitimate and honorable warfare

against them. In fact, I do not know but that we will be better off eventually, and place ourselves in a better position before the public by declining to even meet the rates of the opposition company, maintain our present rates, and beat them down simply and solely by the superiority of our service. I really think from what Manager Glass tells me about the character of their construction that we could do this. But it might be somewhat hazardous and I do not know but what the best policy would be for us to notify our patrons at once that we will accord them the same rates asked by the opposition."

And yet in the face of such representations as are contained in the above letters, the general manager of the Southern Bell company, Mr. W. T. Gentry, has made an open attempt to saddle me with the responsibility of originating and advocating such a ruinous policy. On the contrary, I fought it strenuously, in oral argument even more vigorously than in writing, but my views did not prevail, and the absurd policy, by whom originated I do not know, but enforced from Boston, was adopted. I was required to notify the Durham subscribers and people that on the day on which the service of the opposition enterprise was inaugurated our charges for service would be reduced to—*n thing*, and that we would continue to serve them with first class service indefinitely, without claiming one cent as compensation therefor. Further than that Manager Glass was instructed to take all the new subscribers he could get at those very liberal rates!

(*To be continued.*)

The Telephone in the Courts

By A. H. McMillan

What are Gross Earnings?

The Minnesota gross earnings tax law has been receiving many interpretations of late. The latest decision holds that the state has a right to impose a tax upon the property within its borders regardless of the uses to which it is devoted by its owners; and, as a method of determining what is a fair and equitable property tax, it may permit the tax to be computed on the basis of a fixed percentage of the earnings of the property. This holding in effect declares the law to be constitutional.

The court also holds that the adoption of this law effected a change in the form but not in the character of the tax, the gross earnings tax being a tax upon the property of the corporations and not upon the companies themselves, nor upon their right to engage in business.

In deciding what constitutes gross earnings, the court made the following holdings:

A proportionate part of the earnings of the property of telephone companies within this state, resulting from its use in interstate commerce, constitutes a part of its gross earnings upon which it must pay the 3 per cent tax.

Money collected by a telephone company from its patrons and subscribers for other telephone companies with which it has traffic arrangements, is not a part of its gross earnings.

Money received from messengers not regularly in the company's service, but employed especially to call non-subscribers to the telephone stations, and money collected from the company's patrons and subscribers as messenger charges actually paid to persons in whose buildings the company's booths are located and as compensation for such location are a part of the gross earnings.

The amounts which the regular rates would have produced, had the service, which was in fact rendered without charge, been charged for at the regular rates, is not a part of the gross earnings. State vs. Northwestern Telephone Exchange Company, 120 N. W., 534.

Distance Between Telephone and Electric Wires.

The ordinances of the city of Omaha, Neb., required an electric light company to maintain its wires in a taut condition to avoid swinging contacts, to keep such wires properly insulated, and, wherever it is necessary for such electric light wires to cross the line of a telegraph or telephone company, to string its wires at a distance of not less than five feet from the wires of the telegraph or telephone company. While these ordinances were in force, Peter E. Olson, employed by the Nebraska Telephone Company as a "ground man," was injured while assisting in stringing cables along a street. He was working at a height of about thirty feet from the ground, seated in a metallic car, when an electric light wire came in contact with the car, and he received a violent electric shock which caused him to lose his hold and fall to the ground, suffering severe injuries. Olson brought suit against both the telephone and electric light companies, offering testimony to show that the wires of the electric light company, where they crossed those of the telephone company, were separated from them only by a distance of from twelve to eighteen inches, instead of five feet as required by the city ordinances; that the insulation at that point was entirely worn off, and that their light wire was loose and swinging instead of being taut. A judgment was entered for the defendants, but this was reversed by the Supreme Court of Nebraska which ordered a new trial, holding that a failure on the part of the electric light company to comply with any of the requirements of the ordinance would render it liable. Olson vs. Nebraska Telephone Company, 120 N. W., 421.

Railroads Can Be Compelled to Install Telephone Systems.

That the State Railroad Commission of Georgia has power and authority to require railroads to put in local telephone systems whenever these facilities seem to be reasonably demanded for the convenience of their patrons is the opinion of Judge Hines, special attorney for the commission, recently filed in writing with the commission's Secretary. This abstract question grows out of a petition from Roberta, where the citizens asked that the Commission order the railway to install a telephone in its depot.

City Sued for Telephones Furnished Officials.

After giving telephone service to the city officials of Des Moines, Iowa, for a period of five years without receiving a cent of money, the Mutual Telephone Company brought suit in the district court against the city for $7,094.55. The bill includes service extended to former mayors, aldermen and other officials and some who are holding office at the present time. The city contends that this free service was given in exchange for the franchise under which the company is operating, but the company does not agree to this.

Letters on Practical Subjects

Corroded Jack Springs Vex Exchange Owner.

There has been so much written in the last few years on switchboard troubles that it would seem at first thought that the entire subject has been exhausted, and nothing new remains to be said. This, however, is not true. We never will reach a point where we can say, "There is nothing new to be said on this subject." I don't mention this because the particular trouble I wish to relate is a new one. It is a trouble frequently neglected or never repaired.

I am operating a small exchange having about two hundred subscribers. My switchboard has been used about five years. New cords and plugs were installed two years ago. Recently complaints began coming in from subscribers that operators cut them off right in the middle of their conversations. Thinking the cords were wearing out, I cut off and reset all plugs that showed any sign of wear. This, however, did not help matters any. The trouble grew worse and worse. I got so I was ashamed to go down on the street for fear some irate subscribers would ask why I did not close up, saying that their telephones would do them as much good that way as the other. You can imagine how these remarks stung and cut to the quick, when I tell you without boasting that my subscribers had claimed they got the best service in the county. About this time I decided positively that I would not be outdone in any such manner, after nine years of success in all kinds of switchboard troubles. I took the board myself and made tests as people talked.

I finally located my trouble as an open circuit between the sleeve of the plug and the sleeve of the jack, when the plug was inserted. I unscrewed the thimble from the jack of this particular number and, holding it so as to let the light pass through it, I discovered that the inside surface was covered with a thin coating of foreign substance, which had accumulated from operators handling plugs with sweaty fingers, perhaps. Or perhaps our "sand storms" of Texas had something to do with it. Anyway, each thimble was removed from its jack, and cleansed by pulling through a cloth saturated with coal oil, afterward rubbing with a clean, dry cloth. The plugs were also coated, and in like manner were made clean. My troubles on this line vanished like a dream when the rag was pulled through the last thimble.

Price Kiker,
Tolar, Texas. Proprietor Tolar Telephone Company.

A Washington River Crossing.

The accompanying photographs give a side and end view of the high crossing equipment, with special fixtures, for the toll lead which crosses the Skagit River, from the corner of Myrtle and Main Streets, Mt. Vernon, to Blaumer's Island, Washington. This crossing was erected by Mr. J. M. Stamps, of the Pacific Telephone and Telegraph Company, and is one of the finest pieces of construction work that the writer has ever seen.

The crossing will carry the toll lines going north from Mt. Vernon to Anacortes, Bellingham, and other northern points. It will replace a submarine cable formerly in use at this point.

The poles at each end of the long span are 120 feet in length, and are placed 15 feet in the ground, resting on a platform of 8x8-in. cedar, double thickness, concrete encasing the butt 2 ft. in depth. The span is 520 ft. long.

There are three fixtures, consisting of four regular ten pin cross-arms held together by 1½ x ¼-in. straps. These are suspended at a distance of 130 ft. from one another, and from the end poles, by means of two 7/16-in. steel messenger strands, passed over special 6x6-in. double cross arms, and terminating on top of the second pole from the crossing, which is 80 ft. high.

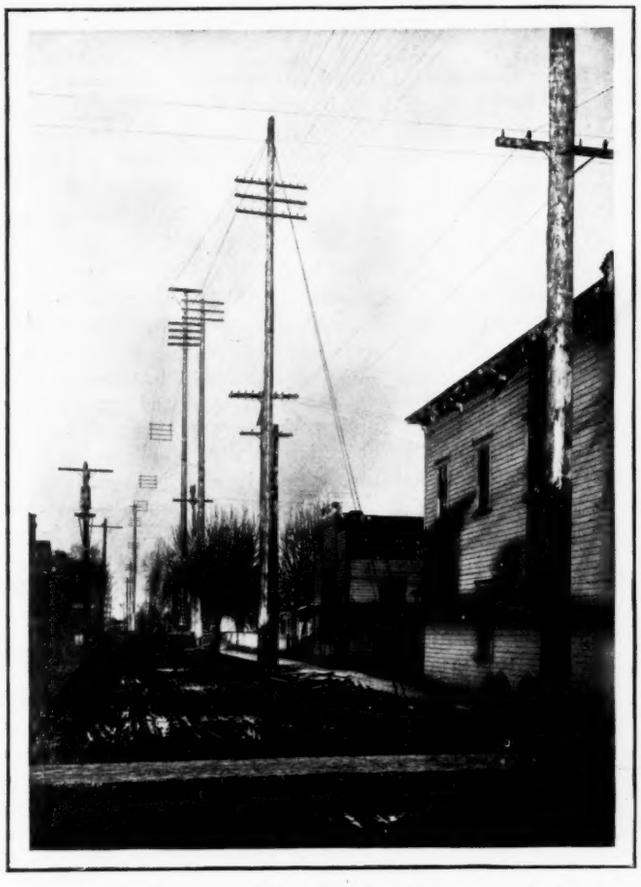
Skagit River Crossing, Washington. Wires on Cross-Arms Suspended From Messengers.

Four 7/16-in. steel messengers run from the top to a crib anchor made of 8x8-in. cedar, 4 ft. by 6 ft. by 16 in., solidly bound together, and set 12 ft. in the ground. The 6x6-in. special double arms are braced by eight 1-in. angle iron braces, 8 ft. long, reinforced at the center by trusses.

The sag in the long span is approximately 10 ft; the fixtures are leveled by hanging the two end ones by a short piece of 7/16-in. steel messenger. At the point of attachment, the messenger is held together by three bolt guy clamps in place of the regular messenger clamps. A third 7/16-in. steel messenger is ended at the same point as the two supporting messengers, but is carried through the center of the 120-ft. poles at the top of the third cross arm, and clamps to the top of the third arm on the fixtures. This is to steady the fixtures.

This crossing, at present, carries six loops of 172-lb. copper, and three loops of No. 9 iron wire. The distance of the wires above the river is approximately 100 ft. and the wires drop from the 120-ft. poles to 90, 80, 70, and 50-ft. poles at each end.

This work was done at a time when the Skagit River was full of drift ice, something which has not happened before for a number of years. The photographs which accompany this letter are the best that we were able to obtain, but do not show the work to the best advantage. The cedar poles used were the finest and straightest poles that it has ever been my good fortune to see.



River Crossing with Poles Running Up to Terminals in Foreground.

Bellingham, Wash. H. E. Constantine.

Telephone Installation of a Swedish Power Line.

In an article on the system of the Hemsjö Power Company, Sweden, Mr. P. Frenell describes, in the *London Electrician*, the telephone circuit which is run on the same poles with the high tension transmission line. The total length of the transmission line is sixty miles. The wires are supported upon iron towers at some parts of the line, and elsewhere on wooden poles. The conductors for power transmission are arranged in an equilateral triangle, with 4-foot sides, and relative positions on the pins are changed every 15 poles, so as to make a full spiral transportation in 6 steps for every space of 90 poles. Poles are spaced 44 yards apart. The arrangement of the telephone line is described in the article as follows:

"Along the transmission lines, and mounted on the same poles, are telephone lines connecting the power and transformer stations. The company have considered it necessary to have their own telephones in order to enable them to supply power efficiently. As is well known, it is very difficult to get a telephone line to transmit articulate sounds when mounted on the same poles as high-tension conductors. The following precautions have here been taken. The telephone line has been transposed on each pole, very good insulators have been used, when entering the buildings the telephone wires have been insulated as high-tension conductors and the telephone apparatus has been placed on insulators. In order to lead away induced currents the telephone wires have been earthed at several places through reactances. These reactances allow currents of low frequency, such as those induced from the transmission line, to pass to the ground, but choke back currents of higher frequency, such as voice currents.

"The telephones are designed as high-tension apparatus and supplied by L. M. Ericsson & Co., Stockholm. Each apparatus is protected by a fuse which blows as soon as a high-tension conductor touches the telephone wires.

"By means of these precautions the Hemsjö Power Company have succeeded in getting a very effective communication between their power and transformer stations. In reality this telephone system works so well that one can scarcely perceive that there is any tension on the line or any current going through the conductors. One circumstance which has greatly aided the success of the telephone system is the transposition of the conductors in the transmission line itself, to which reference has just been made. The telephones are all connected in parallel so that different signals must be used for the different places."

The laws of Sweden relating to the protection of telephone wires from power wires at crossings are very strict. At one crossing described in the article, the telephone wires are carried right through the iron structure of the high tension support, the insulators for the telephone lines being placed on iron racks, which are insulated from the pole. This was done in order to prevent the telephone wires from being charged from the pole in the event of a break or fault on the telephone wires. To protect these wires from an occasional breakage of the high-tension conductors, guard irons have been adopted on each side of the pole both above and beneath the wires.

Central Union Makes Second Reduction in Some Long Distance Rates.

Another step was taken a few days ago by the Central Union Telephone Company in the fight for Ohio long distance business, by further reducing the rate between Columbus and Dayton. Recently a cut of from 40 to 30 cents on the minimum rate was made, and the second cut was to 20 cents. Rates between other points have also been cut.

Pacific Company to Operate in Pasadena Pending Final Decision.

The controversy between the Pacific Telephone and Telegraph Company and the City of Pasadena, in relation to the use of streets for poles and lines, will remain unsettled until the appeal taken by the corporation is decided by the Supreme Court.

Judge Bordwell ruled on June 28 that the right to grant an injunction, pending an appeal, may not be doubted but he requires that the company deposit a sum of money equal to 2 per cent of the gross receipts of the intra-state business, from August 6, 1907, when the twenty-year franchise expired, to May 29, 1909, when the decision adverse to the telephone concern was rendered, amounting to $3,578.12.

The company must also deposit an additional 2 per cent to bring the amount down to date and must give a bond of $15,000, to guarantee the fulfillment of all conditions. It agrees that if the decision of the Supreme Court is adverse, it will pay any percentage established by the city as a tax rate.

The opinion of Judge Bordwell is quite voluminous, consisting of nine typewritten pages, largely devoted, however, to the citing of authorities. It will be recalled that his first decision was that the telephone company had no right to occupy the streets after the expiration of the franchise.

Practical Questions and Answers

Scheme for Laying Out Multiple Distribution.

I enclose a sketch of a scheme for cable distribution, on which I would be pleased to have your opinion.

It differs from most arrangements we use here radically, but I think it has some good points, and gives a fine chance to pick up a pair at nearly any terminal without any more than one multiple of each conductor.

Still no doubt it has weak points you could advise about, and if you would kindly answer in TELEPHONY I would be much obliged to you.

The cable shown in Fig. 1 is a 50-pair unit. I have sketched the conductors in groups of five pairs. The first five pairs in the

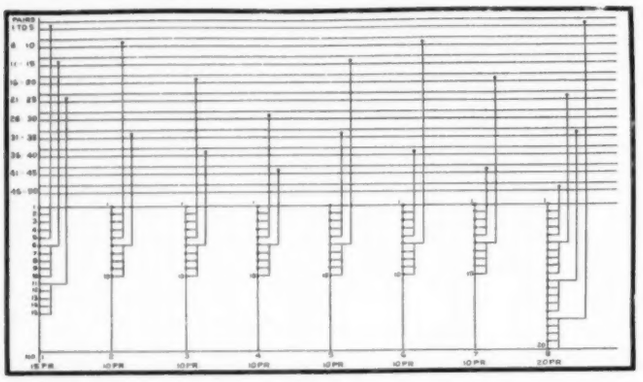


Fig. 1.

last terminal (8) are to be used for lines running ahead only (party lines).

The cable leaves a good margin of spares in the lead. The cans will be placed about every third pole, according to the number of subscribers and prospects.

The first terminal (1) is at the edge of the business district, hence its size; the remainder are in fair residential quarters.

The last terminal, beside lines mentioned above, has to carry any extension which does not warrant cable.

Owing to the insufficiency of information you furnish, we are unable to make our reply to your question as complete as would otherwise be possible, but we submit the following for your consideration:

The method you have used in the sketch sent us (Fig. 1), to indicate the multiple you propose, does not adapt itself readily to show the true results of your calculations. We have, therefore, produced the same results in a more clear and diagrammatic form, as shown in Fig. 2-A. The most simple way in which to solve a problem of this nature is by analysis, therefore we analyze your assignment scheme in the following particulars:

1. There is a 50 pair cable, upon which are to be bridged 1-15, 6-10 and 1-20 pair terminals having a total capacity of 95 pairs. This, therefore, means that to fully multiple the cable, each pair will appear in a terminal 95÷50 or 1.9 times, practically 2 times.

2. In party line distribution, where a new cable is to be

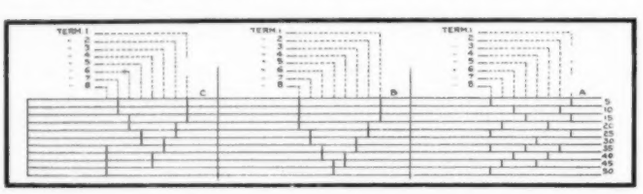


Fig. 2.

extended and no actual data is available as to the ultimate locations of the telephones, the greatest economy will be attained by a uniform multipling of conductors. This does not seem to have been accomplished in your layout. In your letter you stated that 5 pairs were to be reserved in the last terminal for party lines. This would indicate that within the limits of the cable, no party lines are to be served. This does not look like a reasonable deduction, so we will take up the question from two viewpoints: First, that party lines within and without the cable limits may be bridged to the same conductors; and, second, that 5 pairs must be reserved in the last terminal for distinctive service beyond the limits of the cable.

3. Your assignment shows that pairs 26-30 have been used only in terminal 4; that pairs 31-35 have been multipled 3 times; that pairs 46-50 appear but once, and that the balance of pairs, excluding those just mentioned, appear twice. The first serious objection to your assignment is the splitting of pairs in each terminal. The ideal method to be followed in this work is that of consecutive arrangement of pairs in each terminal. Your scheme has two very bad effects; first, the complication of plant records, and second the hazard introduced in splicing, which makes more careful work necessary to avoid errors.

The second serious objection is that you have not provided a uniform multiple, which is clearly shown by the fact that pairs 26-30 appear but once, while pairs 31-35 appear 3 times.

4. On the assumption that 5 pairs need not be reserved in the end terminal, sketch B, Fig. 2, has been worked out to cover your problem, and you will at once note the two main features: First, consecutiveness of pairs in the same terminal; and, second, uniform multipling of conductors.

5. On the assumption that 5 pairs must be reserved in the last terminal, sketch C, Fig. 2, has been worked out, and you will note at once that the same principles as above outlined are incorporated.

Effect of High Resistance Common Ground.

The line to *B* (see Fig. 3) is a grounded line with six 1,600-ohm ringers, and the line to *M* is also grounded, with eight 1,600-ohm ringers on it. A party has both lines and only one telephone. It is wired with a double pole double throw switch, *A*, the instrument wired to the center and one line to each end, both using the

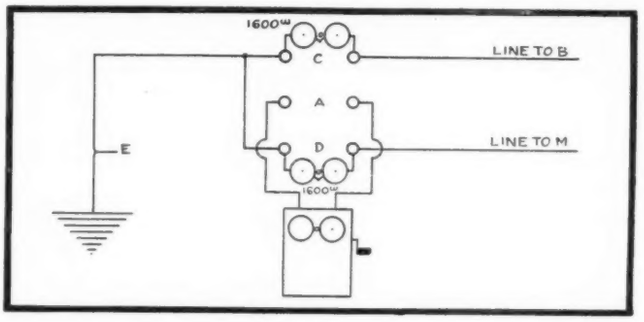


Fig. 3.

same ground. There is no bell on the telephone, but a 1,600-ohm extension bell bridged on each line, as shown at *C* and *D*. The trouble was that when the party attempted to ring "Central" on either line both extension bells would ring, but "Central's" rings, or rings originating on either line would not cause this. The trouble was found at *E*, where the insulated wire was soldered to the copper ground wire. Acid had been used for a flux and it rotted the copper wire, which, of course, caused a very high resistance, the current for this generator seeking the easier path through the 1,600-ohm bells. But why did not the central and line rings cause the same trouble—that is, both bells ringing?

When the subscriber at this station turned his hand generator the line got the full voltage generated, so that both extension bells rang. But when either "Central" rang on the line, the current had to flow over the line through its resistance, which will reduce the voltage effective between the grounded side of the switch and ground. Also, every bell on the line takes current, which further reduces

the named voltage. Hence there may not be high enough voltage between switch and ground to shunt enough current to ring the other bell.

Leak on Parallel Ground Circuits.

We have a local ground circuit wire from *B* to *C* and a ground circuit business wire on same poles, both wires ending in switchboards at each end and having the same grounds. If the local line had a heavy ground on it, would it cause the business wire drop to fall when ringing on the local wire, or vice versa? If a large number of receivers were down on the local line, would it have the same effect? These lines are reported crossed nearly every day and in a few minutes they will be all right again. The local line has about 25 telephones, with no condensers. I don't fully understand this ringing back on extension bells in one of our centrals. With a common ground 10 or 12 lines work all right, while when you ring on one central line nearly all the bells will ring on the different lines. Why is this?

Regarding your first two questions, the presence of a ground on one of the lines will not cause cross rings, neither will a large number of receivers off the hook do it. This is on the assumption that the lines are clear and that the common grounds are of such low resistance that no cross rings result. It looks very much as if you have a swinging cross somewhere. Sometimes a swinging cross will be very difficult to catch. It may or may not be in the lines; perhaps it is in interior wiring somewhere.

That certain line which cross rings with the others may be lightly loaded, so that there is greater tendency for the current to shunt to other lines past the ground resistance. Also, there may be something in the arrangement of the attachments to the common ground which is the cause. Make them all soldered and large copper wire.

Return Wire Against Electric Light Induction.

We have a telephone line running from this town to another town, about 30 miles. We get quite a lot of induction from an electric light plant there, and desire to know if we were to run our ground wires out of town about one or two miles if it would do away with the induction. We have no induction at all at this end, the light plant here being direct current.

It will not kill the induction entirely, but will do good. It is worth trying. If it does not reduce the noise enough, cut in a ring-through repeating coil at the end of the return, making the line metallic to that point. Use the best repeating coil you can buy.

Telephone News

Ohio State Courts Again Enjoin Violation of a U. S. Telephone Company Contract.

Independent telephone men are watching with interest the fight between the Bell interests and the United States Telephone Company at Bellefontaine, O. A few days ago the Home Telephone Company of that place, which is the Independent company, made a connection with the Bell lines. A suit was immediately started in the Common Pleas court praying for an injunction on the grounds that the United States Telephone Company had an exclusive contract with the Home Telephone Company as to long distance business. The injunction was granted and the connection with the Bell lines was severed. The matter will be appealed.

Independents Win in Franchise Contest at Davenport, Washington.

Rcently when the Local and Long Distance Telephone Company (Independent) applied for a franchise at Davenport, Washington, representatives of the Bell companies were out in force to defeat the motion. Although the common council passed the ordinance, the mayor vetoed it and it was necessary to take it up again in council to pass it over this veto. After extended arguments against the ordinance it was finally passed over the mayor's veto by a vote of 6 to 1.

The Independent company is ready to build its system promptly and it is reported that its advent in the near vicinity of Davenport has already brought reductions in rates.

Louisville Citizens Protest Against Cumberland Telephone Company's Assisting Gamblers.

It is reported from Louisville, Ky., that Mr. A. Scott Bullitt, formerly sheriff of Jefferson county, now a prominent attorney of Louisvile, has been employed by prominent citizens to take action against the operators of pool rooms. One of the lines of attack is directed against the Cumberland Telephone & Telegraph Company, which, it is alleged, furnishes service which makes the operations of the gamblers possible. A letter has been sent to the attorney general, asserting that only the conduct of the telephone company makes possible the violation of the law, and appealing to the attorney general to proceed against the company to forfeit its charter to do business in the state of Kentucky. The letter to the attorney general says:

"The Cumberland Telephone Company has been a persistent offender in regard to rendering to the pool-room all the assistance in its power. There must be a large profit in the matter for the telephone company, else it would not willfully and flagrantly violate the law, with all the odium which is attached to such service; so odious, in fact, that the Western Union Telegraph Company has for many years refused to lease its wires for the purpose of furnishing racing news from the pool-rooms."

Fairbury Independent Telephone Company Active in Extending System.

An article in the Fairbury (Neb.) *News* refers at length to the work which the Fairbury Telephone Company is carrying on in extending various parts of its system. So successful has the company been that since the first of the year 200 new installations are reported, and the demands for extensions of lines are coming in from many quarters. At the present time work is under way on rural and toll lines south from the city.

Poles are being set 40 to the mile, and of sufficient size to take care of future business. All poles are being treated with a double coat of preservative. General Manager Bartlett is a firm believer in the idea of putting up good material in a thoroughly workmanlike manner and the result of this policy is showing up in a profitable way. In the town arrangements are now being made for installing cable to replace an extensive portion of the present open wire system.

Michigan Companies May Not Grant Special Rates on Long Term Contracts.

The Citizens Telephone Company of Grand Rapids, Mich., has just lost an important suit in the Circuit Court at Holland, involving a matter of rates. By the decision, unless the case is reverse by the Supreme Court, the company will not be allowed to make any differences in the rates charged patrons of the same class of service.

When the company was about to change the manual board to automatic equipment, it offered, in accordance with its usual practice, to give subscribers who would sign contracts for a certain number of years, the benefit of a

continuance of the old rate during the stipulated period for the new automatic service. The old rates were $15—$24; the new were to be $18—$30 to new subscribers.

The case arose from the fact that after the new system was installed, a new subscriber demanded the new service at the old rate. The company refused, and the party brought suit, claiming discrimination. The case will be appealed.

Public Service Telephone Company (Independent) Tries to Force Entrance into New York Conduits.

On July 10, Justice Erlanger heard arguments in New York City on the application of the Public Service Telephone Company for a writ of mandamus to compel the Empire City Subway Company to allow the plaintiffs to use its conduits. This undoubtedly is the initial movement in another legal controversy for the opening of the streets of New York City to an Independent telephone company. Persons connected with the Public Service Telephone Company, and backing it, are said to be well known in the Independent field.

Work Begun on South Bend Plant Extensions.

The South Bend Home Telephone Company has begun the installation of material extensions to the underground system of that company, involving an expenditure of $50,000. It is estimated that of the $50,000 expended for material and improvements, at least $10,000 will be paid out for labor.

New Equipment and Sales

The Cracraft, Leich Desk Telephone.

The desk telephone is no longer a novelty, and its usefulness has been well demonstrated in the preference frequently displayed by the public for such a telephone in place of that type ordinarily known as a wall set.

Reasons why it has not almost entirely replaced the wall telephone are due, first to its higher initial cost, and, second, to its greater maintenance expense while in service. As the higher maintenance expense is the most serious drawback, particular attention has been paid by the Cracraft, Leich Electric Company to the construction of the

New Desk Telephone, Made by Cracraft, Leich Electric Co.

head and such parts as are likely to become disabled when the instrument is accidentally knocked off a desk or otherwise misused.

Particular attention has also been given to its outlines, in order to produce a neat and pleasing appearance. The stem is of sufficient height to provide for the proper clearance between the receiver and the base when the receiver is suspended from the hook. The hook is as short as practical, keeping the receiver close to the stem.

The most important features, however, must necessarily be those pertaining to such parts as constitute the working mechanism which makes it a practical telephone. The transmitter and receiver are of the company's standard make, of which the high efficiency and stability in service are well known to their extended list of users.

Sufficient room has been allowed in the base to accommodate an induction coil of the same dimensions as that used in the wall telephone. This has been accomplished without making the base too large, or out of proportion to the remaining parts.

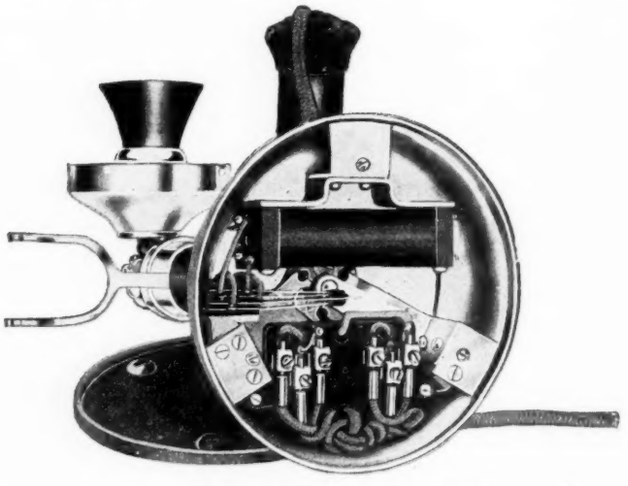
The base is pressed out of sheet metal and has fastened to it, on the inside, three metal lugs which provide suitable means for mounting such parts as the switch springs, induction coil and terminal block.

The base of the stand is nickel plated, or black enameled, either finish giving the stand a neat appearance.

The stem contains no part other than the hook lever and a cylindrical rod extending from this hook lever to the base. The main spring which actuates the hook lever is also mounted in the base, and is readily accessible. The terminal block is provided with connectors which will accommodate either a tip or spade terminal.

The hook-switch springs are provided with platinum contacts, and are so mounted as to be readily inspected. Pure hard rubber only is used for insulation between these springs.

The bottom plate is fastened to the legs by three screws. This plate is provided with slots, and arranged in such a manner that by simply loosening the screws and turning the plate slightly to one side it can be removed without



Base of Cracraft, Leich Desk Stand.

removing the screws from the legs. Another valuable feature is the slotted connection with the transmitter face plate, by which it can be removed without taking the screws completely out.

Changes in Electric Storage Battery Sales Staff.

Mr. H. B. Marshall, who has been for many years connected with the Chicago sales office of The Electric Storage Battery Company in the Marquette building, has recently been appointed contract agent, in charge of that company's

office at St. Louis in the Wainwright building. Mr. Taliaferro Milton, formerly contract agent of the St. Louis office, has been appointed engineer of the Chicago sales office of The Electric Storage Battery Company.

Dean Electric Company Gets Big Contract for St. Joseph Equipment.

The Home Telephone Company of St. Joseph, Missouri, will spend a large sum of money during the coming year rebuilding and extending its exchange system. This company, which is one of the so-called "Gary companies" on account of the extensive participation of Mr. Theodore Gary, of Macon, Missouri, and his associates in its ownership and control, has for some time been planning to put itself in a position to furnish the highest grade of service and the awarding of contracts for exchange equipment, telephones and other supplies has been under consideration.

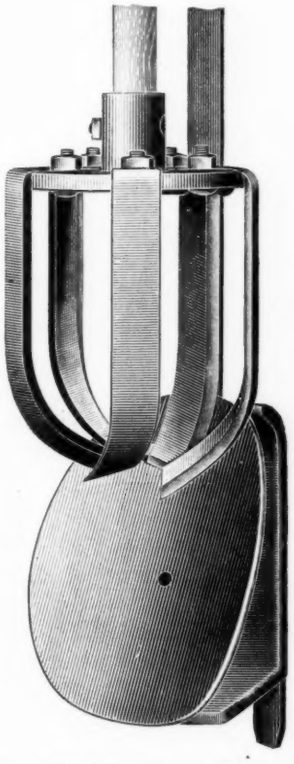
It is understood that a decision was not reached until last Saturday, and the name of the fortunate manufacturer who received the order was at once made public.

The Dean Electric Company, of Elyria, Ohio, will furnish two complete common battery multiple exchanges, with switchboards and all associated equipment. The plant will be arranged for harmonic ringing, and the Dean company will furnish subscribers' telephone equipped for this method of signaling.

The Miller Auger Deflector.

A new device for use with ground augers for boring holes for anchors has just been placed on the market by the Miller Anchor Company, of Norwalk, Ohio.

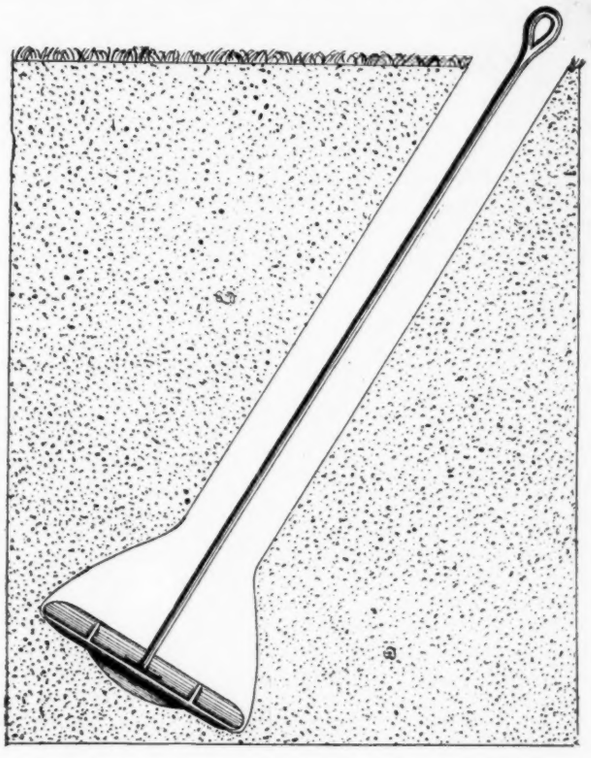
The Auger Deflector, as the device is called, is designed



Deflector and Auger Used to Prepare Hole for Miller Anchor.

to be placed at the bottom of a hole which has been bored to the proper depth for the anchor. The auger is again placed in the hole and is deflected to one side by the deflector, thus enlarging the bottom of the hole on one side. By giving the deflector a half turn, the hole may be enlarged on the opposite side, thus making it of the shape shown in the illustration.

This is of the shape and size for the Miller Safety Anchor which will lie flat or at right angles to the rod. It is said that after the dirt has been tamped solid above the



Miller Anchor in Hole Bored With Auger and Deflector.

anchor, it will not give or pull up when any practically obtainable pulling force is applied to the rod.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, Ill., reports an active demand for its products. Among switchboards that have been sold by this company during the last thirty days are:

Bloomer Telephone Co., Bloomer, Wis., 300 line; Mendon Telephone Co., Mendon, Mo., 200 line; Bluejacket Telephone Co., Bluejacket, Okla., 100 line; Polo & Richmond Telephone Co., Polo, Mo., 2-100 line; Keatchie Telephone Co., Keatchie, La., 100 line; Fennelton Telephone Co., Fennelton, Pa., 100 line; Smithland Telephone Co., Smithland, Ia., 100 line; Farmers' Telephone Co., Carbury, N. D., 100 line; Monument Telephone Co., Monument, Kan., 100 line; Holland Telephone Co., Holland, Minn., 100 line; Simpson Mutual Telephone Co., Simpson, Ill., 100 line; Prescott Telephone Co., Prescott, Wash., 100 line; Citizens Mutual Telephone Co., Cleveland, Wash., 100 line; Hartwick Switchboard Co., Hartwick, Ia., 100 line; Hickman Independent Telephone Co., Hickman, Ky., 200 line; Forest Telephone Co., Forest, Ind., 150 line; Lenore Telephone Co., Lenore, Ill., 100 line; Longley Mutual Telephone Co., Longley, O., 100 line; Citizens Telephone Co., Waverly, Tenn., 100 line; Naconah Valley Telephone Co., White River Jct., Vt., 100 line.

The list would seem to indicate that the Swedish-American company is enjoying a nice business during the so-called dull months. This company has recently issued a new catalogue that will be sent on request.

THE STAR EXPANSION BOLT COMPANY, 147 Cedar street, New York City, has just issued an interesting leaflet describing the "Sebco" drills, which furnish exceptionally efficient means for drilling holes in brick or concrete for the passage of wires.

A Pioneer, Still Working on the Job

When a famous statesman, resting after a lifetime of beneficial effort, gathered together stories of the activities of life which had helped shape the policies of a prosperous nation, he made his final reference to these deeds of the past in words which remain in the memory after the history is forgotten—"All of which I saw, part of which I was." Short as it is, you have there a remarkable sentence, when it is properly used.

The Independent telephone industry has reached a stage of magnitude, permanency, stability, and steadiness of progress which warrants a critical review. Were we indeed so fortunate as to have a complete and accurate history of the development of this great public service, one of the persons best entitled to refer to it in the sentence given us by the man who was a leader, is H. D. Critchfield. He has always been at the front—and, better still, is there now, and belongs there for years to come.

Mr. H. D. Critchfield.

His entrance into the Independent telephone field was almost simultaneous with the very beginning of the existence of the industry.

The Mt. Vernon Telephone Company, of Mt. Vernon, Ohio, was one of the five pioneer Independent plants in that state. It began giving service July 1, 1895, and Mr. Critchfield was one of six men who organized it. For six years previous to this time he had been unconsciously fitting himself for his real work, practicing law in Mt. Vernon. But since 1895 his principal activities and interests have been connected with the Independent telephone movement. In association work his legal training and ability were an almost indispensable aid to the formation of early organizations. His connection with general telephone organizations began almost within a year of his entrance into the business, for in 1896 he was elected secretary of the Ohio Independent Telephone Association, which was destined to be such a factor not only in building up communication at home, but to exert the influence of its example throughout the country. The first National Association to be organized, called the Independent Telephone Association of the United States, was started in 1897, and here again we find Mr. Critchfield lending his services to the important work. The duties of the Constitution Committee of this association, of which Mr. Critchfield was chairman, with no precedents to guide it, were wholly creative. Later the early organization was followed by the present one, under the name of the International Independent Telephone Association, and he has served on the advisory board of the executive committee of this Association from the time of its foundation to the present, with the exception of one year. For five years after the organization of the Association he was its General Counsel, and in this position was associated with older counsel in the preparation and trial of the famous Berliner patent case. This suit was memorable not only because it was an early test of the strength of the Independent companies in opposition to some of the most eminent counsel of the country, working in behalf of a giant corporation with unlimited resources, but because of the winning of this case had the all-important result of establishing the right of the general public to the use of the principles employed in the construction of the modern transmitter, and made possible the competition which has brought about the present wonderful extension of telephone facilities at low rates.

In 1898 he formed a connection with the Everett-Moore Syndicate at Cleveland. As general counsel he was engaged on the development of their telephone properties, including systems at Cleveland, Dayton, the United States Long Distance lines and many smaller properties. For three years he took an exceedingly active part in the organization and extension of properties in which this syndicate was interested.

At the close of this time the Automatic Electric Company, on its organization in Chicago, called upon him to take charge of its legal matters and certain other features of its development, with the title of General Counsel. During his connection with the company at this period, installations of automatic equipment were made at Columbus and Dayton, Ohio; Grand Rapids, Michigan; Los Angeles, California; Lincoln, Nebraska; Sioux City, Iowa; Wilmington, Delaware, and many smaller places.

With the exception of a year, during which he suffered from a severe illness which caused him to relinquish his activities, Mr. Critchfield has been steadily engaged from 1895 up to the present time in some work intimately connected with the growth of the Independent telephone industry, and his influence has been felt in all matters tending

to shape policies on broad lines. Since December of last year, as is well known, he has been General Counsel and Assistant to the President of the International Association. In this position Mr. Critchfield has been called upon to represent the Independent interests in matters pending before legislatures, and in relation to franchises. There were several big fights. Sometimes Mr. Critchfield had to be not only general, but staff, engineer corps, and all the rank and file there was; but he thinks quickly, strikes hard, and wins. If any one thing more than another deserves special mention it was his influence on the situation at Chicago, successfully exerted to prevent the Bell company from purchasing the telephone rights of the Illinois Tunnel Company.

With the legislative sessions over, Mr. Critchfield felt free to resign, and is now associated with the Automatic Electric Company, where he will act in a general advisory capacity, and will also have charge of the contract department for the sale of apparatus in the United States and Canada.

The picture shows the man—a good persuader; when necessary, a good fighter; and always in front in a fight, or afterward in plans for sound development. He is a big, strong man, who stands for broad-gauge, vigorous, clean-cut policies. And, about that fighting—after all, he only fights for Independent telephony; at other times you will find him genial, courteous and able to talk as can only the thoughtful and well informed.

Condensed News Reports

Officers of companies are earnestly requested to forward us promptly all financial and other statements as soon as issued and any items of interest as to their plants and systems

NEW COMPANIES.

LAKE CITY, ARK.—A company to be known as the People's Telephone Company has been organized at this place, and chartered with a capital stock of $10,000. P. J. Springer is president of the new company, and W. W. Perkins secretary.

BOWDEN, GA.—A new telephone company is being organized at this place for the purpose of taking over the Bowden Telephone Exchange and about 50 miles of rural lines. Articles of incorporation, with a capital of $3,000, will be filed. B. W. Little, the present owner, will retain the controlling interest, the above action having been deemed necessary to properly care for business in sight.

WORDEN, ILL.—The Worden Telephone Company has been incorporated to operate a telephone system in this place. The capital stock is placed at $2,500, and the incorporators are: John C. Mueller, Charles W. Piper and F. W. Stocker.

WELCOME, MINN.—The Welcome-Triumph Telephone Company was recently incorporated. Mr. E. Hanley, of Welcome, will have the management of the company.

KALISPELL, MONT.—Articles of incorporation have been filed for the People's Home Telephone Company of Kalispell, by C. J. Bain and others. The company is capitalized at $100,000.

FINDLAY, OHIO.—A company to be known as the Arcade Mutual Telephone Company has been incorporaed by Sherman Huffman, Wm. H. Dilley, E. E. Bish, G. W. Dick, A. L. Anderson, E. T. Dailey and H. J. Harkness. The company is capitalized at $10,000.

NEW BURLINGTON, OHIO. — The New Burlington Mutual Telephone Company has been chartered for operation of a system in and around this town. T. W. Conklin, A. V. Foland, John M. Hill and Walton Compton are the incorporators. Capitalization, $5,000.

ANADARKO, OKLA.—The Anadarko Southern Telephone Company has been incorporated with a capital stock of $1,500. The incorporators of the company are J. E. Stalder, W. S. Henry, Ed. Newhouser, Frank Widek, Charles Smith, M. F. Gilliam and Oliver Richards.

FREEDOM, OKLA.—The Anderson Creek Telephone Exchange was organized recently by J. E. McMoran, R. I. DeGeer and Willis James, of Farry. The capital stock is placed at $1,000.

GASTON, ORE.—The Hill Mutual Telephone Company was recently organized by R. W. Airey, I. S. Ramsey, Charles Holt, C. J. Corstens, David Cruickshank, C. A. Wyman, J. Kopplin, O. G. Cornahan and F. M. Hill. The capital stock is placed at $500.

HILLSBORO, ORE.—O. G. Wilkes, George Stevens and George Schulmerick are the incorporators of the Washington County Telephone Company. Capital, $25,000. This is a reorganization of the Independent Telephone Company.

CHAMBERSBURG, PA.—The Grindstone Hill Rural Telephone Company has been organized with the following officers: President, George M. Branthaver; secretary, Charles Branthaver; treasurer, John Hafer.

MOUNTAINVILLE, PA.—The Mountainville Telephone Company has been incorporated. Lines will be run in Mountainville, Salisbury and vicinity. The incorporators are: Charles H. Stoneback and Frank C. Newcomer, Coopersburg; Charles E. Erney, Frank Wagner, Israel Miller, John J. Weaver, Charles Schubert, Uriah Hildebeitel, M. A. Bitting, Salisbury; and George E. Carter, Emaus.

J. M. McNaughton, C. E. Wright, D. Currie, S. C. Whitman and Otis Malson.

POMEROY, WASH.—A new farmers' telephone line will be built from here and will be known as the Rimrock Farmers Line. The directors are W. H. Thompson, C. F. Yenney and E Halterman; secretary and treasurer, C. F. Yenney.

FINANCIAL.

OSBORNE, KAN.—At a special meeting of the Cheyenne Telephone Company stockholders voted to increase the capital stock of the company from $4,000 to $7,000. The company is in a flourishing condition, many orders for telephones being on the waiting list.

BEMIDJI, MINN.—The directors of the Plantagenet Telephone Company at a recent meeting declared a 10 per cent dividend.

COLUMBIA, NEB.—At a recent meeting of the stockholders of the Platte County Independent Telephone Company, the capital stock of the company was increased from $40,000 to $100,000. New property is to be purchased and the lines and service materially improved and extended.

BUCYRUS, OHIO.—The Bucyrus Telephone Company has increased its capital stock from $100,000 to $150,000.

CLEVELAND, OHIO—Directors of the Cuyahoga Telephone Company declared the regular quarterly dividend of 1½ per cent on preferred stock.

BIRDSBORO, PA.—The Conestoga Telephone Company, at a recent stockholders' meeting, declared a semi-annual dividend of 3 per cent. The company's business is in good condition, and it is expected to pay a semi-annual dividend of 3 per cent from this time on and put aside an equal amount for depreciation and rebuilding. Several months ago the company increased its capital stock from $15,000 to $40,000.

MONROE, WIS.—The Monroe Telephone Company at a recent directors' meeting, declared a semi-annual dividend of 3 per cent. About $2,000 was added to the improvement fund. The Monroe company is in good condition and growing steadily.

FRANCHISES.

BELLVILLE, KAN.—The Rydal Telephone Company has been granted a franchise to construct and maintain a telephone system in this place.

CONSTRUCTION.

DIXON, ILL.—The Dixon Home Telephone Company is planning to make some much needed improvements to its system, necessitated by the steadily increasing business. Several new sections of switchboard will be installed.

FLAGSTAFF, ARIZ.—The Coconino National Forest Service will receive about $11,000 for improvements; $5,000 of this amount will be used for constructing a complete telephone system connecting the different ranger stations as can be reached with the amount to be expended. The lines will be connected with those of the Arizona Overland Telephone Company. This arrangement will be a great improvement for all concerned, as the public will be allowed the use of the Forest Service lines in connection with the long distance lines.

URBANA, ILL.—The Home Telephone Company is stringing a 200 pair cable in the southwest part of the city. This was necessary owing to the increased business, and takes the place of a 50 pair cable.

common battery system with modern equipment, instruments and fixtures will be installed at a cost of between $45,000 and $50,000.

WINNSBORO, LA.—The Winnsboro Telephone Company has received material for the construction of a line to Raysville.

BIRD ISLAND, MINN.—The Bird Island Telephone Company has commenced work on the construction of a new line running north through Osceola, Kingman and Kandiyohi counties, and it is expected that the work of connecting about 100 farmers with Bird Island will be finished within a few weeks.

RICH HILL, MO.—The Rich Hill-Butler Telephone Company is completing arrangements for the overhauling of its entire system. A duplicate line will be built between Butler and Adrian to connect with the line already working between Butler and Rich Hill.

CHILLICOTHE, MO.—The People's Telephone Company's new exchange is nearing completion and it is expected to have about 250 telephones working very soon and the rest cut over and installed as soon as possible.

STEVENSVILLE, MONT.—The Independent Telephone Company of Butte is taking up the work of installing a telephone system in this place. The switchboard has already been received and will be installed very soon.

LYONS, NEB.—The Independent Telephone Company will construct a line among the farmers of this vicinity.

ELY, NEV.—The directors of the White Pine Telephone Company have instructed General Manager Bennett to reconstruct the line between Ely and the mines.

COEUR D'ALENE, WASH.—The Interstate Telephone Company commenced improvements to its lines and service a short time ago. Two miles of additional aerial cable will be installed throughout the city. A new three-position switchboard will be added to those already installed in the exchange, adding about 160 lines to the system. This company is in a prosperous condition, the list of subscribers having increased in the past year and a half from 200 to 650.

WHITE BLUFF, WASH.—The White Bluff and Columbia River Telephone Company has completed its line from this place to Kennewick.

WINNIPEG, MAN., CAN.—The Canadian Pacific Railway Company has started men at work stringing long distance telephone wires which will extend from coast to coast along its system.

ELECTIONS.

DUQUOIN, ILL.—The Murphysboro Telephone Company, which recently completed a merger of the Ohio and Mississippi Telephone Company, composed of the systems at Anna, Benton, Duquoin, Carbondale, Marion and several smaller systems, and also the systems at Harrisburg, Herrin, Carterville, Johnston City, Campbell Hill and Ava, has elected the following officers: President, A. B. Minton of Murphysboro; vice-president, W. S. Dean of Ava; secretary-treasurer, J. G. Hardy of Murphysboro. Directors: A. B. Minton, W. C. Alexander, S. Logan and John G. Hardy, of Murphysboro; C. V. Parker, Harrisburg; R. G. Flemming, Johnston City, and H. R. Hampton, Carterville. W. M. Walsh of Carterville has been made general manager of the company.

BEMIDJI, MINN.—At a recent stockholders' meeting of the Plantagenet Telephone Company, A. H. Jester was elected president, F. S. Lycan, treasurer, and E. A. Schneider, secretary. These officers with J. A. Wessell, of St. Paul, and Charles Vandersluis, of Bemidji, constitute the board of directors. The reports submitted at this meeting show the company to be in good condition, financially and otherwise.

NEWFOLDEN, MINN.—The annual meeting of the Newfolden Central Telephone Company was held here recently. It was decided that the switchboard which is now in use at Ellerth shall be moved to Newfolden. Officers were elected, as follows: O. L. Brekkestran, president; A. Korstad, vice-president; Alfred Johnson, secretary; H. E. Myhre (re-elected), treasurer, and Ole Hjelle, director.

CARBONDALE, MO.—At the annual meeting of the stockholders of the Carbondale Telephone Company, George Kirkner was elected president; Arthur Weatzig, secretary; John Patterson, treasurer, and James Carpenter, S. D. Barry, F. P. O'Neil and D. L. Miller, directors.

HALE, MO.—The annual meeting of the Midland Telephone Company was held at this place recently and the following officers were elected: P. C. Green, president; F. W. Rickenbrode, vice-president; G. A. Marple, secretary; Dr. Marshall L. Bartlett, James Gibson and William Forsythe, directors.

LACONIA, N. H.—Officers elected at the annual meeting of the Citizens' Telephone Company are: President, A. W. Abbott; secretary, E. H. Shannon; treasurer, S. B. Cole; directors, A. W. Abbott, John W. Ashman, T. E. Prescott, H. Beckford, Charles Odell, J. H. Dow, Victor Heserick and Willis P. Odell. William Johnson is manager.

ELLENBURGH, N. Y.—The annual meeting of the Ellenburgh Telephone Company was held recently and the following directors were elected: Benjamin McGregor, S. S. Cooledge, J. H. Moore, O. B. Frazier, M. B. Hinds, C. D. Watson, F. H. Gardnier. At a meeting of the directors the following officers were elected: President, J. H. Moore; vice-president and general manager, F. H. Gardinier; secretary and treasurer, C. D. Watson.

FAIRVIEW, N. D.—At the annual meeting of the Cathway Telephone Company, Fairview line, Harry Violett was elected president, and Thomas Swanson, director. The rest of the officers and directors were re-elected.

IRONTON, OHIO.—The directors of the Home Telephone Company have elected Col. H. A. Marting, president; J. H. Lucas, vice-president; F. L. McCauley, treasurer; B. F. Forgey, secretary, and J. A. McDowell, general manager. The annual report of the general manager showed most gratifying gains in new telephones. The outlook for increased business is very bright.

BLUNT, S. D.—The Medicine Valley Telephone Company held its annual meeting recently and officers elected were: Andrew Nelson, president; W. S. Haynes, secretary, and W. H. Eckert, treasurer.

KAYSVILLE, UTAH.—The directors of the Davis County Telephone Company met recently and elected John S. White as president, and S. S. Howard general manager. Dr. Sumner Gleason, the former president, resigned on account of his inability to devote his entire time to the work.

QUEBEC, ONT., CAN.—The annual meeting of the stockholders of the National Telephone Company was held recently and as a result of the election the following officers and directors were chosen: President, Joseph Paquet, Levis; vice-president, Hon. Ad. Turgeon; secretary-treasurer, E. Beaubin, Levis; general manager, J. F. Demers, Levis, and the directors are: George Demers, Neuville Belleau, Hon. Richard Turner, A. B. Dupuis and Henry D. Barry, all of Quebec; Etienne Dusseault and Ed. Couture, Levis, Quebec; J. H. Frechette, Ste. Claire, Quebec; John McWilliams, of Father Point, Quebec.

MISCELLANEOUS.

DECKER, IND.—The Wabash Home Telephone Company has been purchased by three local men and will be reincorporated with a capital stock of $10,000 under the name of the White River Valley Telephone Company. The officers of the company are: D. N. Lane, president; Richard Ready, vice-president, and J. F. Breithaupt, secretary-treasurer. This system was formerly owned by the Wabash Home Telephone Company of Monroe, Ind.

HOPE, IND.—The Hope Independent Telephone system has been sold to J. W. D. Aspy, Joseph Burney, Ardell Burney, Frank Tyner, A. J. McQueen and Gilbert J. Dennison. This includes likewise the plant at Hartsville. The new owners announce that extensive improvements will be made, and lines will be extended to accommodate an additional number of subscribers.

NEWTON, IA.—The Boone County Telephone Company will replace the manual system now in use in this city with a complete automatic system.

ALPENA, MICH.—The Alpena Mutual Benefit Telephone Company, through purchase, has become the owner and operator of the Farmers' Mutual Telephone Company of Montmorenci County. Mr. H. F. Barbour has been appointed general manager of the Montmorenci County, Farmers' Mutual and Alpena telephone exchanges.

LOWVILLE, N. Y.—The Black River Telephone Company, of this place, having exchanges in the counties of Oneida, Lewis, Jefferson and Oswego, has purchased control of the company from the Rochester, Syracuse & Utica Telephone Company. At a special meeting of the company held in Utica recently, Alexander Cowie, of Syracuse, W. R. McCanne, of Rochester, and C. H. Poole, of Utica, resigned from the board of directors, and S. C. Capron, of Boonville, Payson Thompson, of Henderson, and George S. Reed, of Lowville, were elected in their places. Other directors are C. W. Pratt and William Karlen, of Boonville, and John J. Bowser, of Lowville. At a meeting of the directors C. W. Pratt was elected president and treasurer; S. C. Capron, secretary, and J. J. Bowser, manager.

GUTHRIE, OKLA.—Oklahoma City citizens have filed suit against the Pioneer Telephone & Telegraph Company in Oklahoma City preventing it from raising rates. The sliding rate scale there is causing much trouble. The company now claims to have 5,000 telephones in operation, which the citizens dispute, maintaining that a P. B. X. extension telephone is not a telephone.

UNDERGROUND.

WATHENA, KAN.—The Northeast Telephone Company is making arrangements for the placing of its telephone lines underground.

UTICA, N. Y.—The Home Telephone Company has awarded a contract for building about a mile of underground conduit in the residence district.

SAVANNAH, GA.—The city council is now acting on an ordinance whereby all telegraph and telephone lines will have to be placed underground. All telephone wires in the downtown district are already underground, but the residence district has open wire construction.

BLOOMINGTON, ILL.—The McLean County telephone system has been purchased by the Kinloch Telephone Company. This deal has been pending for about two years, but it was not until recently that an agreement was made. The Kinloch company will take possession about September 1. The McLean County Telephone Company was organized 11 years ago, with F. Y. Hamilton as president, who has held that office ever since. It has always been in excellent condition, but this past year suffered severely from the heavy sleet storms. In spite of this, however, it is still in a very prosperous condition. The Kinloch company will materially improve the system in every way. An order has already been placed for 14,000 ft. of underground cable, which will be installed this fall.